

modern
machine
shop



THE ASTME
TOOL SHOW
AND
CONFERENCE
IN PRINT

See Page 160

APRIL 1960



OK

IMPORTANT! *At Detroit ASTE Tool Show, Booth 567, we reveal for the first time several important new developments in multiple operation tools.*

THE OK TOOL COMPANY, INC., Milford, N.H. MAKERS OF 3001 METAL-CUTTING TOOLS



automation-

where so much depends on so little
when the tool tip contacts the work

The modern automated production line is a miracle of cost-saving efficiency. But all its ingenious complexity has but one purpose—to bring work and tooling together. *That's* the point where it either pays off or it doesn't.

To assure maximum productivity—hence maximum return on the investment—cutting tools must be sharpened with machine precision. When they are ground on a Heald Model 4 Tool Sharpening Machine, *exact tool geometry* is obtained every time—and cutting edges *last longer*, saving down-time for tool replacement.

This advanced design machine is available for both true-radius and conventional elliptical-point tool grinding. Its fully automatic tool reciprocation assures uniform and repetitive tool tip accuracy and permits one operator to tend several machines at the same time.

Ask your Heald engineer for complete information on the Model 4 Tool Sharpening Machine, or send for Bulletin 2-4-3, Issue 1.



It **PAYS** to come to Heald



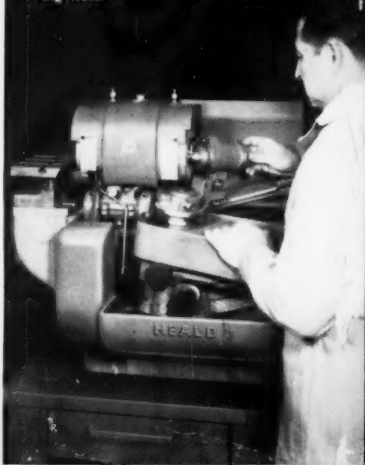
THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.
Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • Lansing • New York • Philadelphia • Syracuse

For more data circle 302 on Postpaid Card

Heald Model 4 Tool Sharpening Machine arranged for true-radius grinding of constant-clearance-angle tools which are ideal for contouring work.



M. L. Forney, *Publisher*
 Richard S. Kline, *General Manager*
 Fred W. Vogel, *Editor*
 Robert I. Shore, *Managing Editor*
 L. L. Baldhoff, *New Equipment Editor*
 M. C. Due, *Editorial Assistant*
 Gilbert C. Close, *Field Editor*
 Alfred M. Cooper, *Contributing Editor*
 Norman S. Rogers, *Art Editor*
 Howard Campbell, *Editor Emeritus*
 K. M. Gettelman, *Circulation Manager*

modern machine shop

The
Idea-Full
Magazine

contents

Vol. 32, No. 11, April, 1960

FEATURES IN THIS ISSUE

Tooling	
Management	
Hobbing	
Machine Maintenance	
Press Working	
Automation	
Drilling	
Carbide Tooling	
Turning	
Boring	
Coolants	
★ ★ ★	
ASTME	
ENGINEERING	
CONFERENCE	
AND	
EXHIBIT	

DEVELOPMENTS IN TOOL MATERIALS AND PROCESSES.....	126
By Norman Zlatin	
HOW TO SOLVE YOUR SUPERVISORY PROBLEMS.....	134
By Alfred M. Cooper	
HOBGING AUTOMOTIVE TRANSMISSION SHAFTS.....	136
By G. Bruce Collins	
HOW TO IMPROVE YOUR PLANT LUBRICATION SYSTEM.....	140
By M. L. Klaiber	
AUTOMATIC PRODUCTION OF SPEEDOMETER HOUSINGS.....	150
AUTOMATION IN A TOOLROOM.....	151
TURRET DRILL COMBINES MACHINING AND ASSEMBLY.....	152
CARBIDE TOOLING USED TO ROUGH TURN BILLETS.....	153
TOOLING ADAPTS MACHINE FOR COMPLEX OPERATIONS.....	156
STANDARD MACHINE PERFORMS MULTIPLE OPERATIONS.....	158
CUTTING FLUID IMPROVES BAR MACHINE PERFORMANCE.....	158
ASTME ENGINEERING CONFERENCE AND EXHIBIT.....	160
ASTME TECHNICAL PROGRAM.....	166
ASTME PLANT TOURS.....	176
FLOOR PLAN OF DETROIT ARTILLERY ARMORY.....	182
LIST OF EXHIBITORS.....	184
ON DISPLAY AT ASTME TOOL SHOW.....	224

DEPARTMENTS

IMPORTANT MEETING DATES.....	56	FREE LITERATURE.....	200
OVER THE EDITOR'S DESK.....	118	WHERE TO GET IT.....	354
REPORT FROM WASHINGTON.....	122	INDEX TO ADVERTISEMENTS.....	366



Member



A Statement of Policy

The principal function of MODERN MACHINE SHOP is to search out and disseminate the best and newest ideas for the advancement of engineering skill and mechanical efficiency in the metalworking industry, and neither effort nor expense is, or shall be, spared in the performance of this task.

RECENT DEVELOPMENTS IN TOOL MATERIALS AND PROCESSES

By Norman Zlatin

The author discusses typical applications and advantages of ceramic and carbide tools and materials, the electrical discharge method of machining, electrolytic grinding, ultrasonic machining and the chemical milling process. Mr. Zlatin is Vice President and one of the founders of Metcut Research Associates, Inc., Cincinnati, Ohio, which has been actively engaged in metal cutting and metallurgical research for the past 10 years.

Page 126

HOW TO SOLVE YOUR SUPERVISORY PROBLEMS

By Alfred M. Cooper

Once a good supervisor has been selected, it is up to everyone connected in any way with industry to see to it that his authority to run his department is in no degree curtailed.

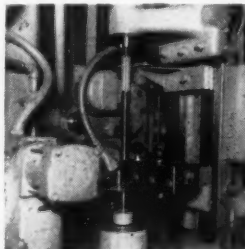
Page 134

HOBBIING AUTOMOTIVE TRANSMISSION SHAFTS

By G. Bruce Collins

An eight-spindle vertical production hobbing machine, now in operation in the plant of a Japanese automotive firm producing transmission shafts, is tooled up to cut three different splines in a 21-inch shaft that is forged of cold rolled steel.

Page 136



in this issue

VOL. 32 • NO. 11

HOW TO IMPROVE YOUR PLANT LUBRICATION SYSTEM

By M. L. Klaiber

Discussed are lubrication practices that are somewhat unusual yet which, in most cases and with a minor amount of effort and change, can be incorporated in plant lubrication control systems already in operation.

Page 140

TOOLING FOR PRODUCTIVITY

This special presentation includes a number of case histories illustrating and describing a variety of tooling setups designed for increasing the production of different metal parts, including transfer press, grinder, drill, boring machine, lathe and bar machine tooling setups.



Page 150

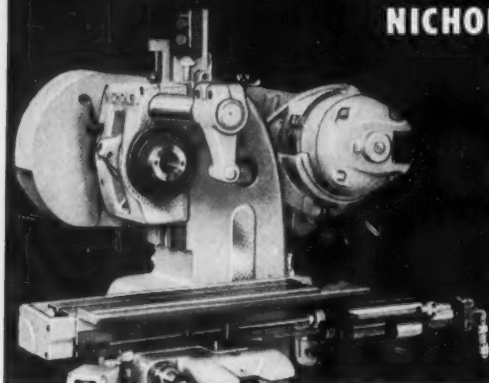
ASTME CONFERENCE AND EXHIBIT

"Tooling for Productivity" is the theme of the American Society of Tool and Manufacturing Engineers' Engineering Conference and Exhibit which is to be held in Detroit from April 21 through 28. In addition to general information regarding the "Tool Show," this section presents the complete technical program which will be held concurrently with the Show; a list of available ASTME plant tours; complete floor plans of the Detroit Artillery Armory where the Exhibit will be held; and a complete list of exhibitors. Moreover, there are illustrations and descriptions of the various tools, machines and materials that will be displayed.

Page 160

modern machine shop

3 TIMES THE MACHINE



NICHOLS model 6-SA is:



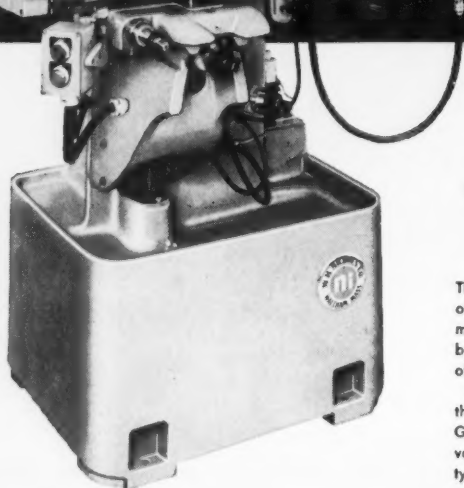
A high production semi-automatic miller



or a hand miller for short runs



or quickly convertible to a Precision Tool Room Miller



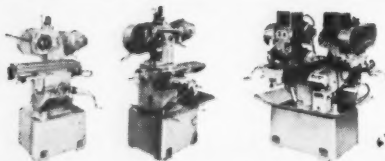
AT HALF THE PRICE

The Nichols model 6-SA costs less than half the price of many machines assigned to precision small parts milling. Its versatile design means continued savings by eliminating idle time. One machine does the work of 3 part-time millers.

For precision small parts milling, you can't do better than Nichols, "The Millers that Use Their Heads." Guaranteed accuracy to 10ths combined with the versatility of rise and fall spindle head and knee type construction.



Write for details on the complete Nichols line, "The Millers that Use Their Heads"
Sound, color, 35mm. movie "The Millers that Use Their Heads" available on free loan basis.



MANUFACTURED BY W. H. NICHOLS COMPANY

National Distributors **REM SALES INC.**

subsidiary of The Robert E. Morris Company

5004 FARMINGTON AVENUE • WEST HARTFORD 7, CONN

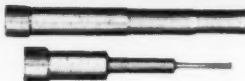
For more data circle 321 on Postpaid Card

CLEVELAND 1 $\frac{5}{8}$ " DIALMATIC

"Increased production 500%", reports Decker Nut Mfg. Corp.



With dial control of infinitely variable spindle speeds and turret tool feeds, this 1 $\frac{5}{8}$ " Model AB Cleveland Single Spindle Automatic has increased production 500% on close tolerance machining of cold heading tools for Decker Nut Mfg. Corp. Typical tools are shown below. Shown at the machine are R. R. Hunt, foreman, and B. L. Konkle, operator and set-up man.



TOP—Long pierce punch (H. S. Steel) machined in 5 operations. Cleveland time: 20/hr. gross. Lathe time: 7/hr. gross.

BOTTOM—Short pierce punch (H. S. Steel) machined in 6 operations. Cleveland time: 17/hr. gross. Lathe time: 7/hr. gross.



Square die (High Cr Die Steel) machined in 7 operations. Cleveland time: 10/hr. gross. Lathe time: 22 min. each.



Nose die (Cr W Tool Steel) machined in 7 operations. Cleveland time: 9/hr. gross. Lathe time: 25 min. each.

Let a Cleveland field engineer show you how *Clevalands Cut Costs!* For machine specifications write for General Bulletin.

DECKER NUT MANUFACTURING CORP.

Manufacturers of
COLD HEADED INDUSTRIAL FASTENERS
Albion, Michigan

Cleveland Automatic Machine Company
Cincinnati, 12, Ohio

Gentlemen:-

Attention: Mr. Frohaska

The 1-5/8 Dialmatic which we purchased recently has resulted in substantial savings in our toolroom cost. These savings were realized immediately. Where we had been using lathes to make tools for our cold-heading equipment we now use the Dialmatic completely.

The use of this machine has increased production of tools at least 500%. Coupled with the savings in time and labor we have reduced the possibility of human errors to practically nothing. This machine runs exclusively on tool steels at very close tolerances.

Our satisfaction with your equipment would not be complete without mentioning the fine cooperation that we receive from your sales and service people.

Should it be necessary to increase our facilities along this line, your equipment will most certainly be our choice.

Yours very truly,

DECKER NUT MANUFACTURING CORP.,

Edwin W. Konkle

Edwin W. Konkle
Pres. & Gen. Mgr.

ENK/CT

Sales Offices: Chicago • Cleveland • Detroit • Hartford • Springfield, N.J.

CLEVELAND

AUTOMATIC MACHINE COMPANY

4940 Beech Street • Cincinnati 12, Ohio

Single Spindle Automatic Screw Machines and High Pressure Hydraulic Die Casting Machines

For more data circle 322 on Postpaid Card

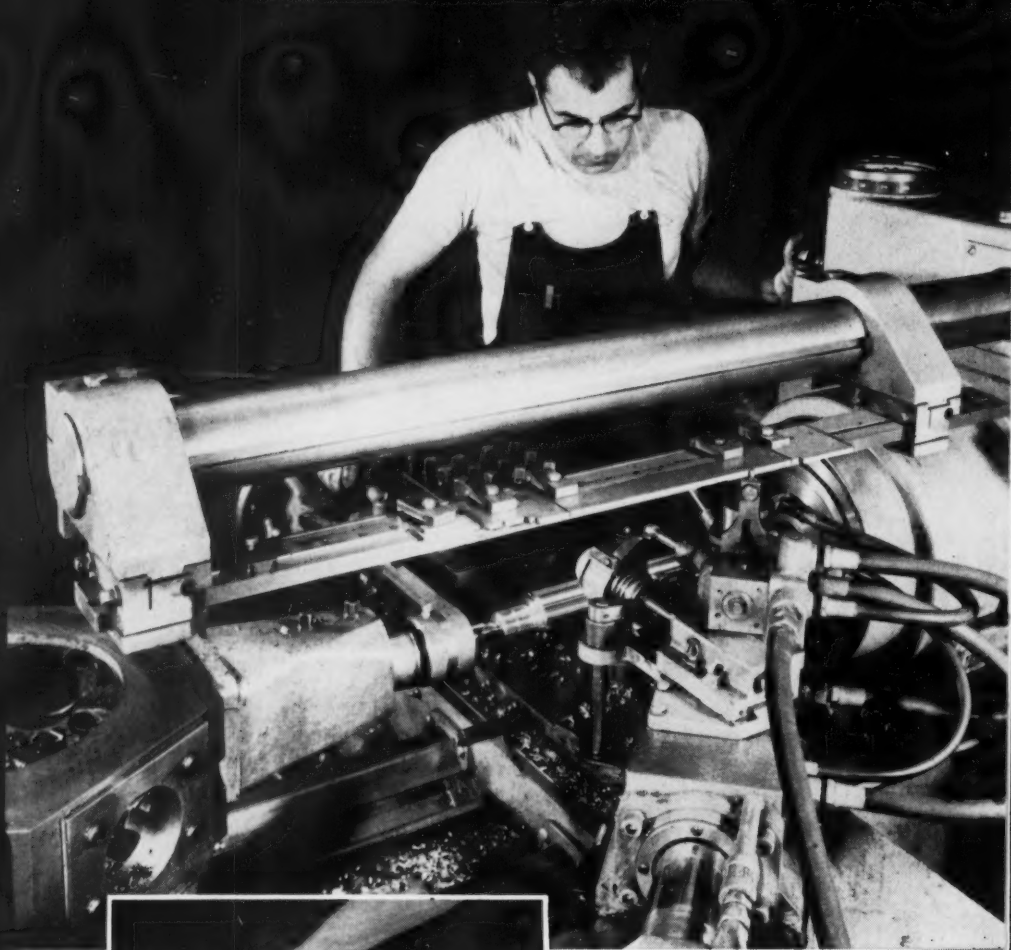
April, 1960

MODERN MACHINE SHOP 5

AT **HOBART BROTHERS COMPANY**

TROY, OHIO

a Warner & Swasey 2-A with contouring



Unique Section Template was one idea which Hobart tooling specialists came up with to reduce setup time and minimize template costs. A short template was made up to handle a range of shafts with similar ends. Various length middle sections could then be quickly inserted to obtain various lengths and shoulder locations.

cross slide SLASHES SETUP TIME FROM 2 HOURS TO 20 MINUTES

● *Combines auxiliary operations into one setup*

Hobart Brothers Co.—a leading producer of arc welding equipment and aircraft ground-power units—faced a serious production bottleneck. Long setup time on their older turret lathes and excessive part handling time was crippling the small lot production of motor-generator shafts.

Hobart launched a three-pronged attack to solve the problem by:

1. Installation of a new Warner & Swasey 2-A Saddle Type Turret Lathe equipped with a hydraulically-controlled cross slide contour unit.
2. A creative tooling approach to reduce setup time.
3. A thorough time and motion study to insure efficient utilization of daily production time.

As a result, Hobart Brothers today are producing shafts at 1948 production costs!

Contributing to the success of this efficiency study and modernization program was their new contour cross

slide equipped Warner & Swasey 2-A which permitted:

- Combining of center drilling, facing and threading operations into a single, efficient turret lathe setup reducing part handling time.
- Production time savings averaging 35% because of higher horsepower and spindle speeds, and elimination of extra hex turret and square turret handling time. All diameters and grinding reliefs are produced directly from the template.
- Holding closer tolerances which reduced grinding time and extended grinding wheel life.

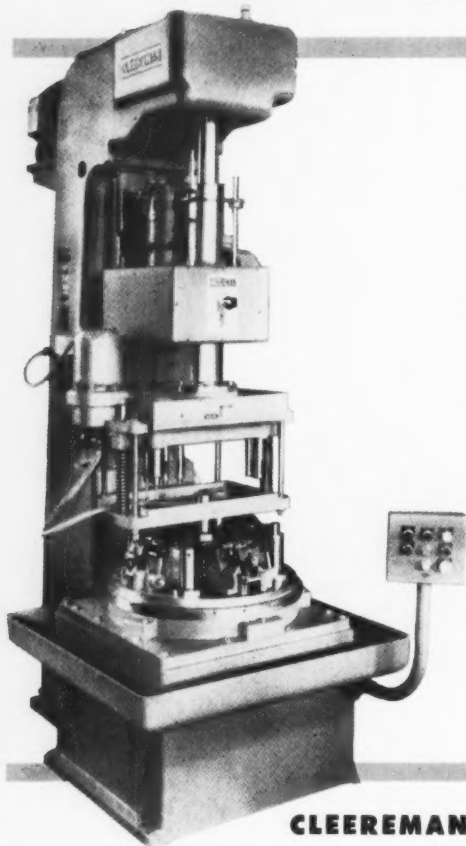
Check today with your Warner & Swasey Field Representative. He'll gladly tell you how the cost-cutting results of the "Hobart Story" can be a reality on your own operations.



YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS... WITH A WARNER & SWASEY
For more data circle 323 on Postpaid Card

CLEEREMAN CREATES

Special Automatic Drilling and Tapping
Machines adapted to your individual
work problems at a moderate price



An example of one such adaptation is presented by the accompanying photograph which shows a standard Cleereman "Series A" Automatic Drilling and Tapping Machine equipped with Multiple Spindle Head and Rotary Index Table to produce thousands of finished parts week after week with an exceedingly low capital investment.

A fixed center, combination drilling and tapping head is attached to the flanged spindle quill of the standard machine. The multiple spindle head has six spindles arranged in three groups of two each. High speed, non-reversing spindles for drilling and chamfering are driven by an auxiliary motor mounted on the head; slower speed, reversing tapping spindles are driven by the machine spindle. Correct speed and geared tap lead are obtained by pick-off gears in the top head of the machine.

Rotation of the index table is timed with the spindle cycle to provide fully automatic operation. The machine operator loads the work-pieces and depresses the "Cycle Start" push-button; the rotary table indexes; the spindles power rapid traverse to the work; drills, taps and chamfering tools feed; tapping spindles reverse at depth and lead out; spindles power rapid traverse up—and the job is completed—quickly—automatically—without fatigue or error.

What is your problem?

A specialized "standard" Cleereman Series A Automatic may be your answer for greatly lowered production costs and increased production with a nominal investment.

See your local Cleereman distributor, or wire, write, or phone direct.

CLEEREMAN MACHINE TOOL CORP.

GREEN BAY, WISCONSIN

General Distributors: The Jackson-Fotsch Company • 7350 West Lawrence Avenue • Chicago 31, Illinois

For more data circle 324 on Postpaid Card



Thor
Everything you
want in
Air Grinders ...
and more!

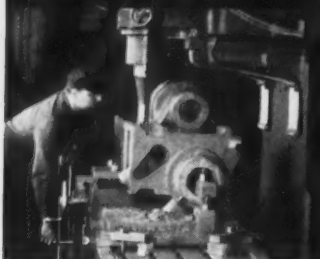
Thor No. 5 series heavy duty air grinders. Safest grinders ever built. 100% increase in power at no increase in weight. Remove far more metal in far less time. Positive safety control, in addition to standard governor, absolutely prevents "run-away" tools. If governor fails, air supply is cut off. Weight 10 lbs. Grip, lever or butterfly throttle. 4,500 and 6,000 r.p.m. grinding speeds.

Your Thor factory representative or distributor will demonstrate. Thor Power Tool Company, Aurora, Illinois. Branches in all principal cities.

For more data circle 325 on Postpaid Card

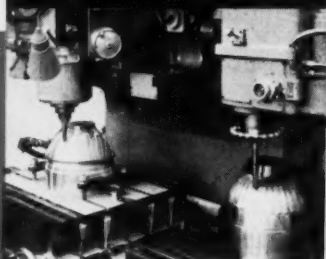
Here's what the **CINCINNATI**

general-purpose milling

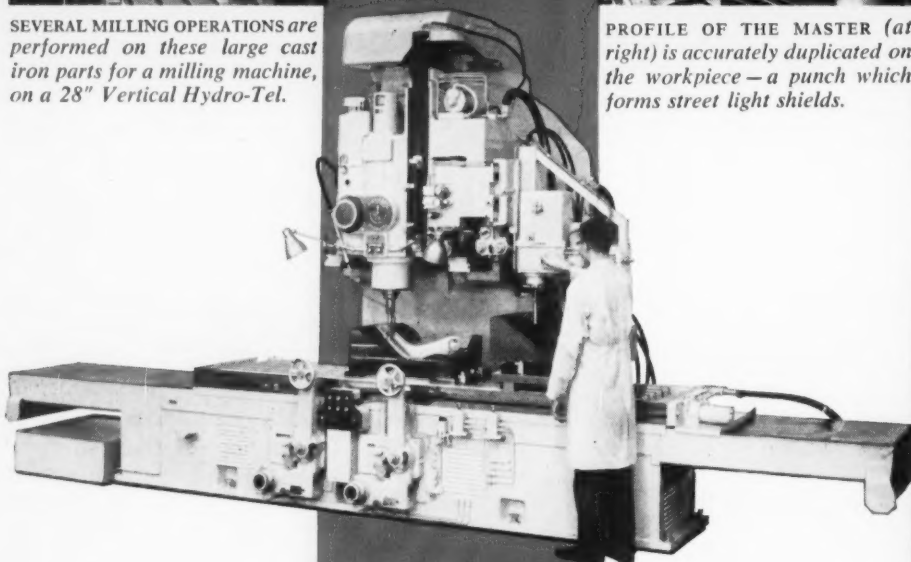


SEVERAL MILLING OPERATIONS are performed on these large cast iron parts for a milling machine, on a 28" Vertical Hydro-Tel.

automatic profile tracing



PROFILE OF THE MASTER (at right) is accurately duplicated on the workpiece — a punch which forms street light shields.

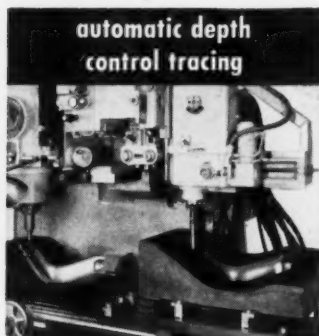


CINCINNATI 30"x96" Vertical Hydro-Tel Milling Machine. Catalog No. M-1923-2.

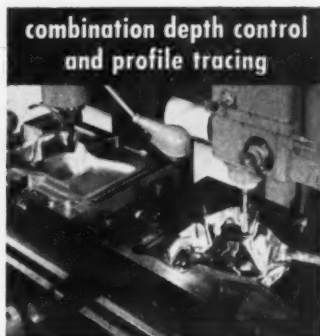
BUILDERS OF FINE MACHINE TOOLS: KNEE TYPE AND BED TYPE MILLING MACHINES • DIE SINKING MACHINES •

THE CINCINNATI MILLING MACHINE CO., CINCINNATI 9, OHIO

HYDRO-TEL *can do for you...*



DIE FOR AUTOMOBILE ARM REST is cut on a 30" Hydro-Tel (see large illustration on left page).



COMBINATION TRACING of a life-size dress form mold on a 28" Hydro-Tel. This complex part is completed in a single setup.

For lower costs and greater productivity consider the versatile Hydro-Tels. Basically, these machines are flexible general-purpose millers, rigidly constructed and powered to take a healthy cut. Features include hydraulic activation of all slides, with finger-tip touch manual servo controls; infinitely variable, independent feed rates for table, cross-slide and vertical head (if desired); single lever directional controls for feed and rapid traverse of table and cross-slide; dial selection of spindle speeds. All controls are within convenient reach from the operating position.

Hydro-Tels are even more than efficient general-purpose milling machines: when equipped with standard tracer units they meet the highest requirements of die sinking and production shops. Automatic depth control tracing, 360° automatic profiling and various combinations of these two methods simplify accurate reproduction of the most complex shapes. And a wide array of multiple spindle heads are available to suit your machining operations and production schedules.

Let our Field Engineers explain what CINCINNATI Hydro-Tel Milling Machines can do in *your* shop. For further information write for Catalogs M-1773-3 and M-1923-2.

UTTER AND TOOL GRINDERS • ELECTRICAL DISCHARGE MACHINES

CINCINNATI®

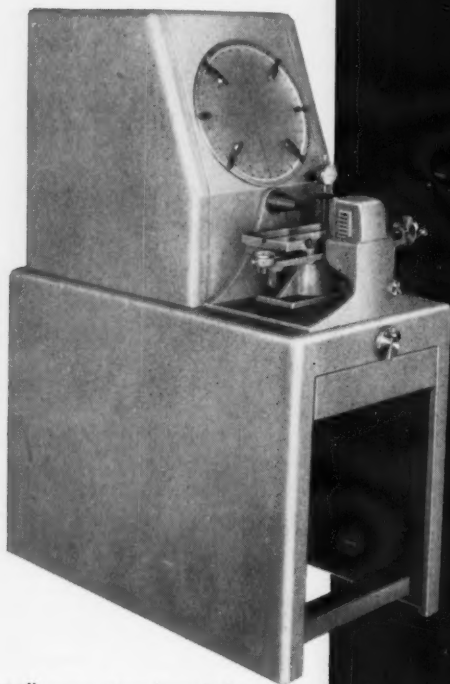
MILLING MACHINE DIVISION

For more data circle 326 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 11

**YOURS
FOR ONLY
\$1075**



14" screen gives large halo-free image.

Stage has 13" x 6" work area — moves 6" horizontally, 2 1/4" vertically.



Micro-Precision a Covel Tradition — Since 1874

**PRECISION
GRINDERS**

BENTON HARBOR, MICHIGAN

For more data circle 327 on Postpaid Card

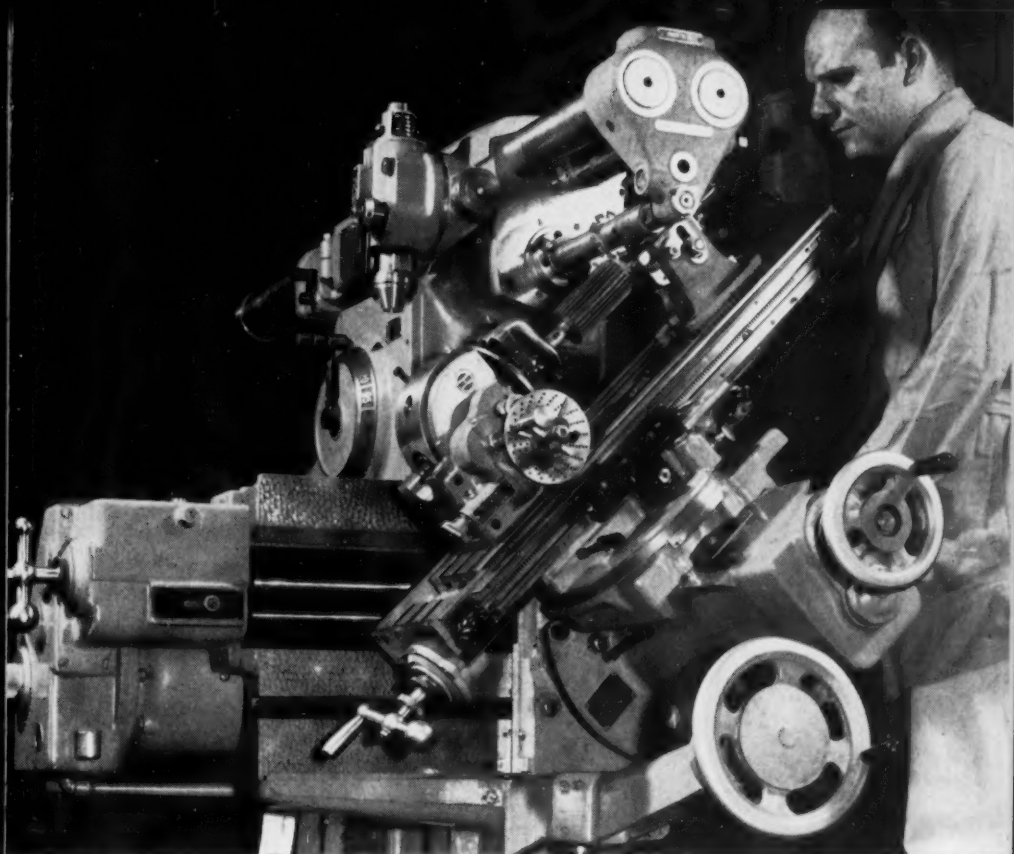
*Precision
inspection
that's fast,
economical*



MICRO-PRECISION OPTICAL COMPARATOR

Yes, regardless of the size of your tool room or shop, you can have the time-saving and money-saving advantages of micro-precision optical inspection — for only \$1,075.00! It's an investment that will pay for itself many times over. Team a Covel Micro-precision Optical Comparator with a Covel Micro-Precision Grinder — you'll have a team that can't be beat for micro-precision accuracy!

Send for complete details on the Covel Optical Comparator. Ask for Bulletin M40-C.



Makes the cuts that "can't be done" -the Brown & Sharpe OMNIVERSAL®

The Brown & Sharpe Omniversal Milling Machine is a standard machine "made-to-order" for the complex milling increasingly required in toolroom, experimental, and prototype work. Nothing else can match its combination of work-range, versatility, and dependable accuracy.

It simplifies the multi-operation jobs — permits milling at various angles without relocating work — saves set-up time. It handles spiral taper and other complex cuts

that are impossible on other machines. Plenty of capacity, too — with a total horizontal feed of 34", and a 15" vertical adjustment.

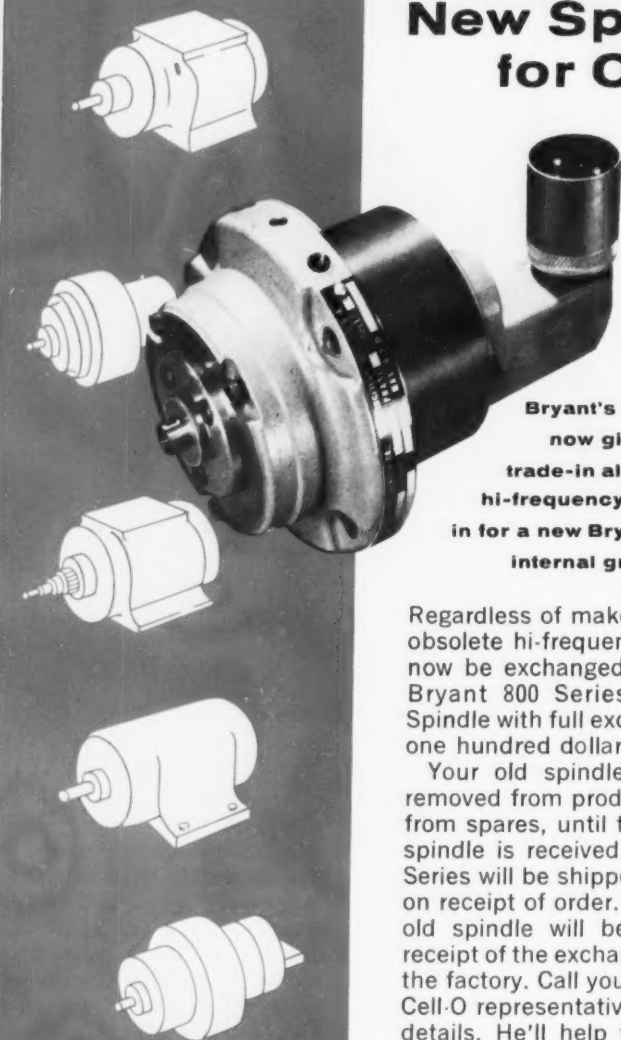
When you invest in toolroom milling equipment, get the machine that will do *all* the work, and pay top returns in dollars saved . . . get the Omniversal.

For details, write: Machine Tool Division, Brown & Sharpe Mfg. Co., Providence 1, Rhode Island.

Brown & Sharpe  **PRECISION CENTER**

For more data circle 328 on Postpaid Card

New Spindles for Old!



**Bryant's Exchange Plan
now gives you a \$100
trade-in allowance on any
hi-frequency spindle turned
in for a new Bryant 800 Series
internal grinding Spindle**

Regardless of make — your old or obsolete hi-frequency spindle can now be exchanged toward a new Bryant 800 Series hi-frequency Spindle with full exchange credit of one hundred dollars.

Your old spindle need not be removed from production, or even from spares, until the new Bryant spindle is received. Your new 800 Series will be shipped immediately on receipt of order. Credit for your old spindle will be issued upon receipt of the exchanged spindle at the factory. Call your Bryant or Ex-Cell-O representative for complete details. He'll help you select the proper Bryant equipment for your machines, regardless of make.

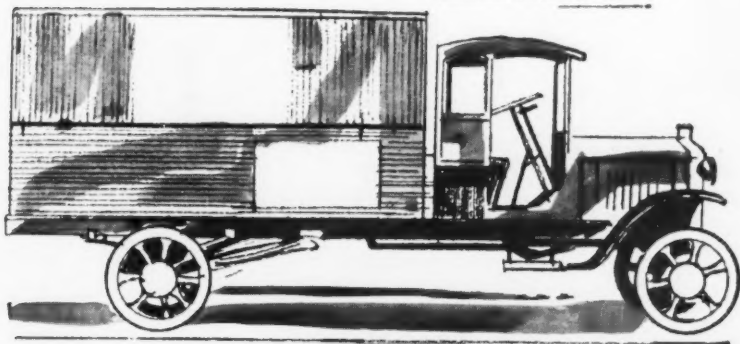
BRYANT

Chucking Grinder Co.

Springfield • Vermont

For more data circle 329 on Postpaid Card

Delivering lo\$ profit\$?



You can't afford to deliver your goods in obsolete equipment; that would be poor economy and tough on your name.

But what about obsolete production equipment? It may be out of sight, but it delivers a far greater loss in wasted time and manpower, excessive unit costs and reduced quality.

You might be surprised how easy it is to turn these losses into profits with a modern Gisholt Turret Lathe. These rugged lathes incorporate all the advantages you need to keep ahead of demands for higher, faster production and lower costs.

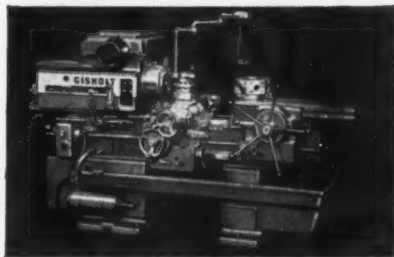
Ask your Gisholt Representative about Gisholt Ram and Saddle Type Turret Lathes — how they can be put to work in your plant earning extra profits, paying for themselves. Call him today or write for literature.

GISHOLT

MACHINE COMPANY

Madison 10, Wisconsin

Investigate Gisholt's Extended
Payment and Leasing Plans



Gisholt Ram Type Turret Lathe



Gisholt Saddle Type Turret Lathe

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes
• Factory-Rebuilt Machines with New Machine Guarantee

For more data circle 330 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 15



NOW!

BIG SHEAR FEATURES IN A LOWER PRICED LINE

Economical to buy *and operate!* Hairline accuracy! Split second action (85 cuts per minute)! Smooth, lively, full of pep and power! You're looking at the Niagara Series One . . . the thrifty line for work up to 10 gage, 10 feet.

And what a line-up of "big shear" features . . .

INSTANT ENGAGING CLUTCH: Famous Niagara 14 point, multiple jaw sleeve design for uniform timing and rhythmic shear operation.

HI-POWER DRIVE: Completely enclosed . . . clutch, gearing and flywheel operate on anti-friction bearings in a bath of oil.

DIRECT CONNECTED MOTOR: High torque, pancake type. No belts, sheaves, nor belt guards.

RUGGED, WELDED STEEL: Bed, holddown, crosshead, housing legs . . . for utmost strength and rigidity.

cost-cutting **NIAGARA**

power squaring shears for sheet metal work

NIAGARA MACHINE & TOOL WORKS • BUFFALO 11, N. Y. •
for more data circle 331 on Postpaid Card

District Offices and Distributors Everywhere

CLOSED BOX SECTION: Bed and crosshead. Horizontal, vertical and torsional stresses resisted with minimum deflection.

AUTOMATIC HOLDDOWN: Self-compensating. Applies instant, uniform pressure, holding sheet flat and tight against bed.

PRECISION GAGING: For micrometer accuracy. Easily adjusted.

LAMINATED, NON-METALLIC WAYS: Adjustable. Guide crosshead accurately.

4-EDGE KNIVES: Quadruple service between regrinds. Heat treated, flush-faced.

THERE'S MORE — get the complete description. See why you're losing money by waiting. Request Bulletin 73 now . . . today!



WELCOME ASTE TOOL SHOW

We Cordially Invite You
to Visit

ECLIPSE BOOTH No. 1239

at the Exhibit

ASTE visitors are also invited
to inspect our plant . . . just
15 minutes from Detroit Artillery
Armory

ECLIPSE
COUNTERBORE
COMPANY



1600 BONNER, DETROIT 20

For more data circle 332 on Postpaid Card

new POPE

PRECISION Internal Grinding SPINDLES

used on BROWN & SHARPE

BRYANT
BULLARD
CINCINNATI
COVEL
EXCELLO

LANDIS
NORTON
REID
THOMPSON
SPRINGFIELD
and others

**with
important
new features
that add up to**

TOLERANCES TO MILLIONTHS

super-precision bearings made to Pope specifications and used exclusively in Pope spindles

total eccentricity of shaft, measured in the tapered hole, will not exceed 20 millionths (.000020)

Assembled spindles are dynamically balanced with all rotating parts in full assembly to 25 millionths (.000025) amplitude of vibration. This assures low micro-inch surface finishes.

INCREASED PRODUCTION

Pope Spindles have the rigidity and the ability to take heavy cuts and produce uniform parts.

LOWER OPERATING AND MAINTENANCE COST

Increased wheel life because the extra large shaft is rigidly supported by ample size bearings.

Saved operating time — one motor driving pulley serves all spindles in most cases.

Permanent lubrication — Pope system of grease lubrication prolongs bearing life, minimizes maintenance expense, and the spindles run cool.

New concealed centrifugal air flow coolant repelling flinger increases bearing life and reduces maintenance expense.

Ask for Catalog No. 57-A and Bulletin No. WA-10, or send us your specifications on the spindles you require.

No. 128

POPE®

ENGINEERS, DESIGNS AND BUILDS
PRECISION ANTI-FRICTION BEARING SPINDLES
FOR EVERY PURPOSE

POPE MACHINERY CORPORATION • 261 RIVER STREET • HAVERHILL, MASS.

Established 1920

For more data circle 333 on Postpaid Card

April, 1960

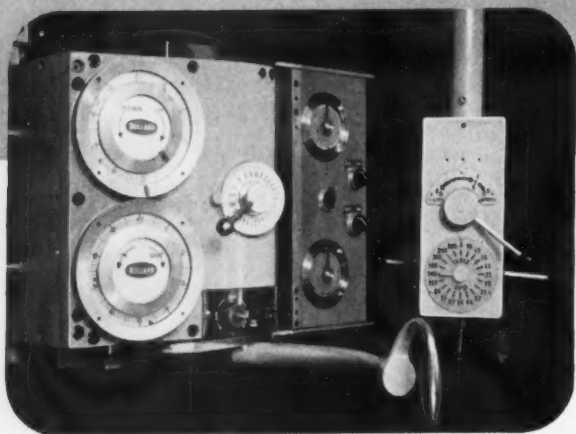
MODERN MACHINE SHOP 19

... Another First from **BULLARD**

Size-Au-Trol*
revolutionary new feature of

Bullard DYNATROL*

**VERTICAL
TURRET
LATHES**



Size-Au-Trol*

provides precise tool positioning control to a degree unobtainable with other vertical turret lathes.

Size-Au-Trol*

after set-up relieves the operator of the responsibility for sizing the work by insuring consistent control of size.

Size-Au-Trol*

repetitively accurate to within .0003, increases productivity by cutting time between cuts.

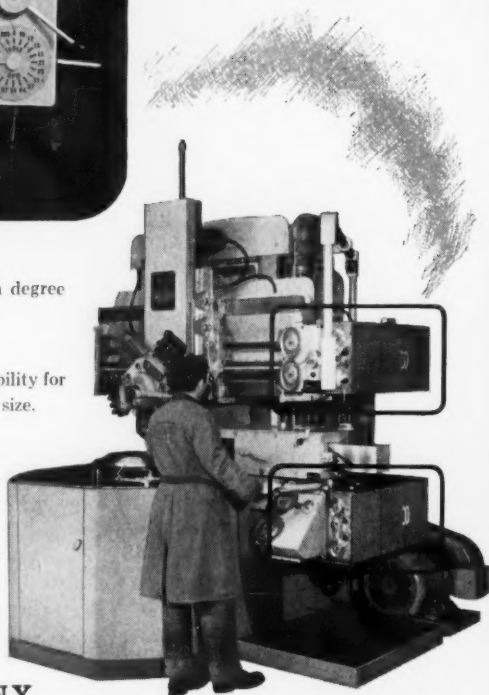
Size-Au-Trol*

is standard equipment on the complete line of Bullard Dynatrol V.T.L.'s.

For information on the completely new Dynatrol* line of vertical turret lathes, contact your nearest Bullard Sales Representative or write

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

For more data circle 334 on Postpaid Card



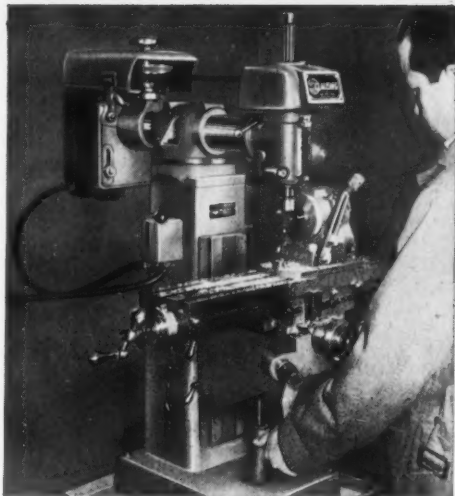
*Trademark

... YOU CAN'T BEAT A BULLARD ...

HERE'S PROOF OF PERFORMANCE...

"The Clausing Vertical Miller is the best machine for the money on the market today! It is most versatile... and extremely accurate".

— F. L. BALLENTINE, EMPIRE TOOL ENGINEERING COMPANY, INC.



The high precision spindle and drive have 7 ball bearings... hardened spindle. Ground and hard chrome plated quill has full length bearing in head.



The spindle head can be swiveled in a vertical plane and set at any angle, and turret rotated in a horizontal plane making it possible to machine at all angles with one set-up.

This report is typical of the experience of users everywhere. The CLAUSING VERTICAL MILLER is a precision machine tool designed for operations where "extremely accurate" machining is required. And, it is an outstanding producer, "most versatile, easiest to set up, get around and operate of any miller at or near its low price." Only \$875 f.o.b. factory.

VERIFIED ACCURACY—Before it leaves the factory each CLAUSING Mill must pass rigid tolerance tests such as:

1. Top of table perpendicular to column ways within .0005" in 6" travel.
2. T-slots square with cross slide dovetails within .0005".
3. Table, parallel to turret within .001".
4. Spindle square with table, front to rear, within .001" T.I.R. in 5" circle.
5. Spindle taper (internal) run out within .0002" at spindle nose.
6. Table T-slots parallel to table dovetail ways within .0005" in 8" longitudinal travel.

MILLS, DRILLS, BORES, REAMS, SHAPES AT ALL ANGLES... WITH ONE WORK SET-UP!

Write for FREE illustrated literature.



CLAUSING DIVISION

ATLAS PRESS COMPANY

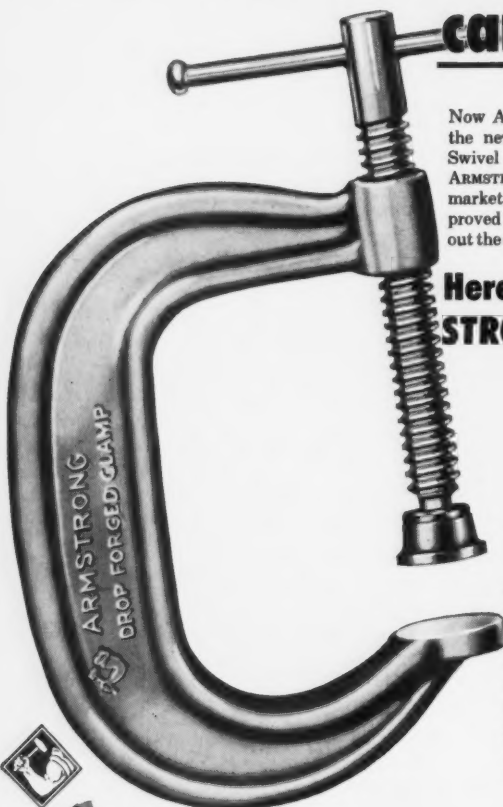
4-110 N. PITCHER ST. • KALAMAZOO, MICH.

For more data circle 335 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 21

New **ARMSTRONG Swivel Pad** **can't come off**



Now ARMSTRONG deep throat "C" Clamps have the new (Pat. apd. for) ARMSTRONG Ball-joint Swivel Pad. This "C" Clamp pad, developed by ARMSTRONG Engineers, is tougher than any on the market. Rigorous testing in our own plant first proved this fact, and field tests in factories throughout the country have confirmed our own test results.

**Here's Why it's
STRONGER...**



The lip of the opening in the ARMSTRONG Ball-joint Swivel Pad is undercut so that when the ball of the screw is inserted, and the lip is permanently forced down, a solid steel wall is formed, inside the pad cavity, completely encircling the ball.

This wall of steel makes it impossible for the pad to come off the screw during normal use. In fact, our tests have proved that it is virtually impossible to intentionally knock the pad off with a hammer—yet the pad is free to swivel through an arc of approximately 40°.

Call your ARMSTRONG Distributor



Heavy Duty
"C" Clamps

Medium Service
"C" Clamps

Spotter Resistant
"C" Clamp

Extra Deep Throat
"C" Clamps

Tool Makers
"C" Clamps

Machinist's
Clamps

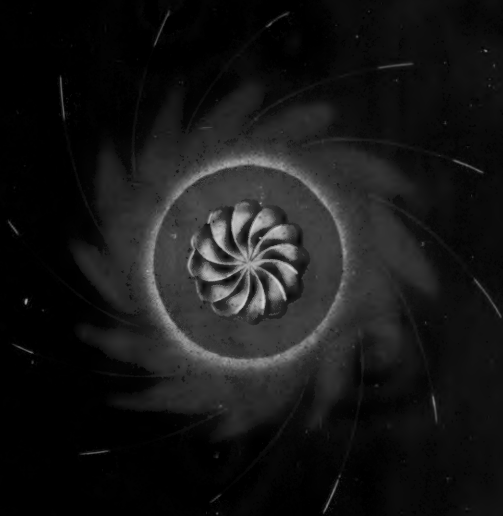
Parallel
Clamps

Your ARMSTRONG Distributor can offer delivery from stock on this "400-Series" deep throat, drop-forged "C" Clamp with the new Ball-joint Swivel Pad. He also carries in stock the other styles of clamps in the ARMSTRONG Line—the broadest line of drop forged "C" Clamps.

See us at ASTE Show,
Detroit, April 21-28, Booth 760.

ARMSTRONG BROS. TOOL CO., 5228 W. ARMSTRONG AVE.
CHICAGO 46, ILLINOIS

For more data circle 336 on Postpaid Card



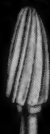
the birth of a new idea...

After years of research and experimentation the Grobet File Company introduces the **FACET**® tooth, a new type of flute that dramatically increases the life and efficiency of **Tungsten Carbide Rotary Files**. A scientifically designed second edge is built into the length of each tooth for greater strength, permitting greater stock removal and faster removal of chips. Build up of edges is largely eliminated, creation of heat greatly reduced and edges stay sharp up to twenty-five times longer.

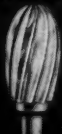
**Patent applied for*



GROBET-USA
G



PL-13
(1/2" x 1")
PL-18
(1/2" x 1 1/2")



PE-16
(1/2" x 1")



PQ-16
(1/2" x 1")



PG-13
(1/2" x 1")



PD-13
(1/2" x 1")



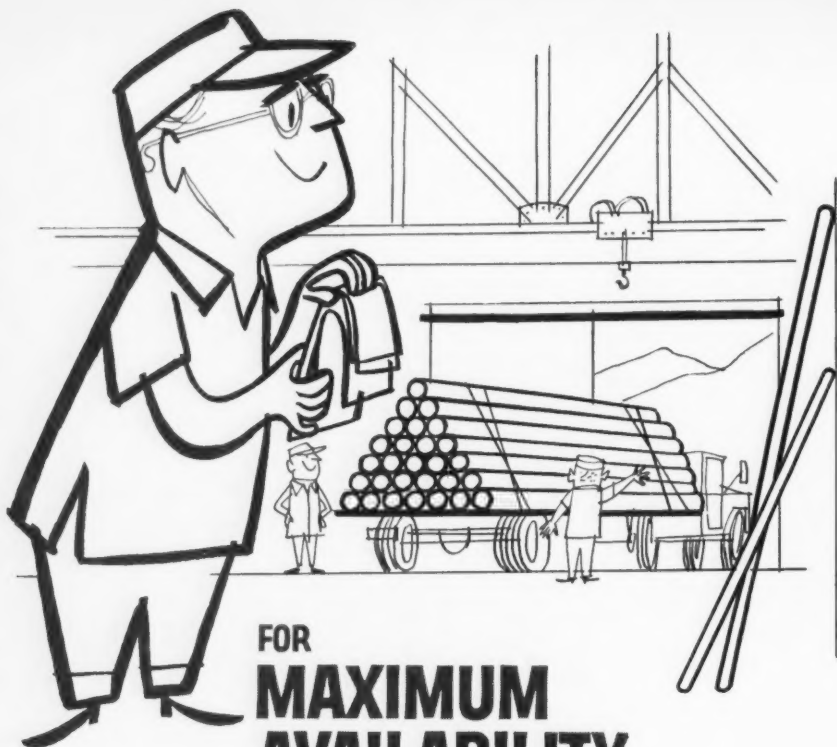
PF-13
(1/2" x 1")

Order from your distributor or write directly to:

GROBET FILE COMPANY OF AMERICA, INC.

CARLSTADT, NEW JERSEY

CHICAGO: 311 DESPLAINES ST.



FOR MAXIMUM AVAILABILITY SPECIFY

B&W Job-Matched seamless mechanical tubing

B&W offers you . . .

- a wide choice of tube diameters, wall thicknesses and lengths
- a broad range of standard and special analyses in carbon or alloy steels
- a complete variety of tube finishes—hot-finished, turned, cold-drawn or roto-rocked
- service from 2 tube mills—plus a nationwide network of district sales offices and steel service centers manned by

experienced tube salesmen—ready to serve you promptly

These are just a few of the many reasons why it pays to specify B&W Job-Matched Seamless Mechanical Tubing. And remember—matching tubes to jobs assures you the *right tube*, in the *right quantity*, at the *right time*. For more information, call your local B&W District Sales Office, or write for Bulletin TB-430. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pennsylvania.

TA-9047-SM1



B&W

THE BABCOCK & WILCOX COMPANY

TUBULAR PRODUCTS DIVISION

Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—
in carbon, alloy and stainless steels and special metals

For more data circle 338 on Postpaid Card

For the new needs of the new age
GORTON "Trace-Master"
Hydraulic Tracer Control

Specially built for high accuracy, high speed profiling and duplicating. Maintains, at fast feeds, the closest tolerances in modern hydraulic tracing.

Nowhere Else

will you find this combination

1. TWO H. P. spindle motor
2. Finest Milling Head in its class
3. 80 to 5,600 RPM spindle speeds
4. Rigidity (2,800 lbs. net weight)
5. Extra long saddle

Nowhere Else

will you find this versatility

1. Production profiling
2. Scanning
3. Duplicating ...
die and mold work
4. Milling ...
conventional and climb
5. Boring



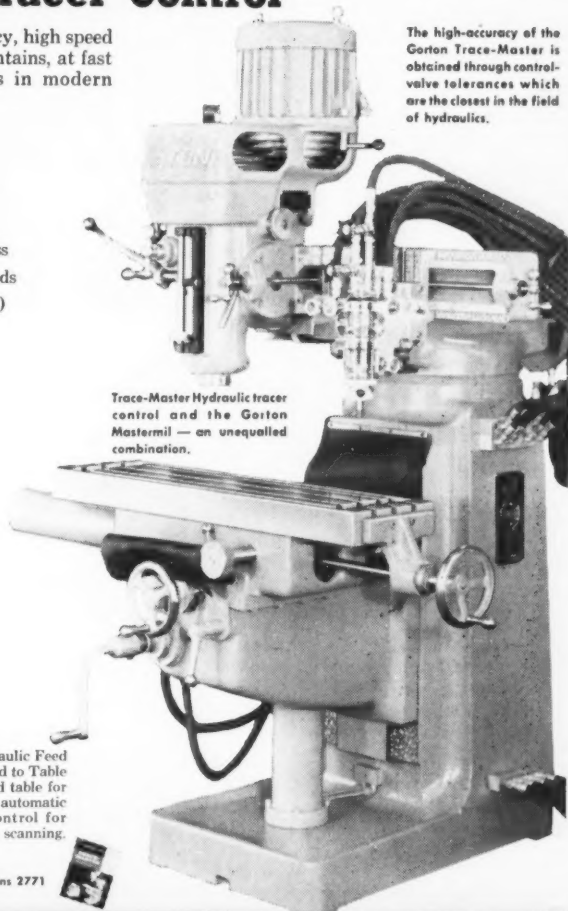
Machine Tool Exposition 1960

2 Models Available: (1) 360° Cross Hydraulic Feed to Ram and Longitudinal Hydraulic Feed to Table (2) 3D Hydraulic Feed to knee, ram and table for 3-dimensional work. Also available with automatic Auto-Trace, electro-hydraulic tracer control for either 2-dimensional or 3-dimensional scanning.

Write for Bulletins 2771

Trace-Master Hydraulic tracer control and the Gorton Mastermill — an unequalled combination.

The high-accuracy of the Gorton Trace-Master is obtained through control-valve tolerances which are the closest in the field of hydraulics.



GEORGE GORTON MACHINE CO.

1704 RACINE ST.

RACINE, WISCONSIN

Milling, Die Sinking, Profiling and Engraving Machines with Manual Hydraulic, Electro-Hydraulic or Numerical Guidance Systems. Special Machines and Automated Transfer or Indexing Machines. Cutting Tools and accessories... Defense and special products.

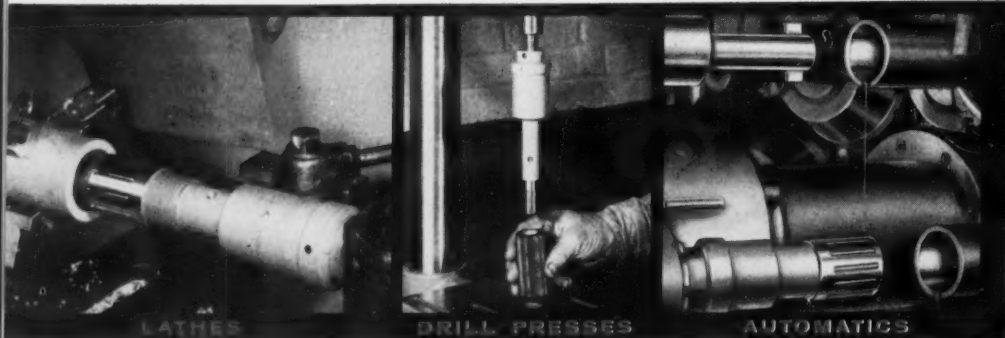
For more data circle 339 on Postpaid Card

April, 1960

MODERN MACHINE SHOP

25

**roughest part surfaces
finished to 4 micro in. or less
*in one pass ... on any machine!***



• **microller[®] burnishing tool finishes or sizes at FEED RATES OF 8 TO 12 IN. PER MIN.!**

• **CUTS PRODUCTION TIME, COSTS, 90% AND MORE!**

- Tool finishes roughest turned surfaces of 120 mu.-in. and higher to 4 mu. and lower in one pass at feed rates of 8 to 12 in. per minute.
 - Finishes all machineable metals. Tools are made for all types of surfaces; internal and external, cylindrical ... tapered, radial, flat.
 - Use tool on any machine. Use it on drill presses or lathes as a secondary operation ... or on automatics where other operations are being performed.
 - rolls last for thousands of parts. Tool maintains size setting. No adjustments necessary. Wearing parts replaceable. Simplest set up and operation. No skill required. Tool feeds and releases automatically.
 - Off the shelf delivery of standard tools and replacement parts.
 - Burnishing action *rolls* out tool marks ... compacting and condensing the grain structure to form a long-wearing, work-hardened surface.
 - The top twenty companies in metalworking ... plus more than a thousand other shops have replaced costly abrasive methods with Microller burnishing. Reports of 90% savings in production time and costs are common. Write for more information or send post-paid card in magazine.
- ADJUSTABLE FOR SIZE CONTROL**
- Sizes in increments of .000075" or less ... performs sizing operations never before possible. Invaluable for bearing seats, oilite bushings, salvaging parts out of tolerance, etc.
 - Run thousands of parts without tool wear. No stones to replace. Precision-hardened

*or more data circle 340 on Postpaid Card

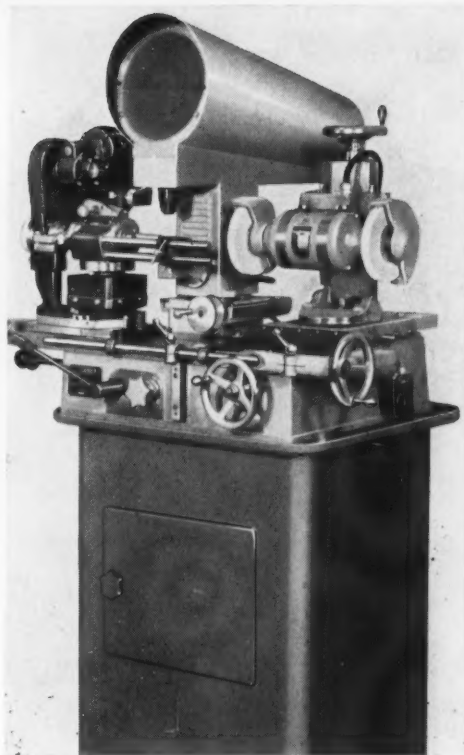


MADISON FAESSLER TOOL CO.

P. O. BOX 1137, PROVIDENCE, R. I.

**SEE THE
R-O
IN OPERATION**

**A.S.T.M.E.
SHOW
APRIL 21 - 28
DETROIT
BOOTH 560**



SEE THE NEW R-O SWING-IN COMPARATOR!

There is always a crowd at the R-O booth because metalworking men are always looking for ways to do things better. Here's a tool that produces form relief on cutters, adding to their life and cutting ability—that does a dozen and one jobs in the tool room faster and easier than they've ever been done before. It's in use on thousands of jobs across this country and in 14 foreign countries.

RO
**UNIVERSAL
FORM RELIEVING
FIXTURE**

R-O Grinder

R-O MANUFACTURING COMPANY
31171 Stephenson Highway, Madison Heights, Mich.

Please forward the R-O catalog.

Firm _____
Address _____
City _____ Zone _____ State _____
Per _____
Title _____

For more data circle 341 on Postpaid Card



They're here!

New Victor High Speed and Duraband Saw Blades

**— Increase cutting speeds on both
high speed and standard equipment**

New Victor High Speed Band Saw Blades take temperatures up to 1100° F. Built to last longer, they cut quickly through the toughest alloys at maximum feed and speed for the material being cut.

New Victor Duraband Heavy Duty Band Saw Blades used on *standard* equipment . . . enable you to operate higher feed and speed rates . . . extends the range of the materials to be cut. This long-life band, made of new alloy steel, cuts production costs because it outlasts other bands.

Individual containers, clearly marked for instant identification, are used to package both these new Victor bands. And they're cut and welded to your exact specifications.

Call your local Victor authorized distributor today to order these improved new Victor Bands. He's the same fellow that handles the standard Victor bands in the revolutionary, Reel-Pac dispenser . . . plus a complete line of other outstanding Victor metal cutting tools. It's a good idea to contact him now.

©1965



VICTOR

VICTOR Saw Works, Inc.
METAL CUTTING PRODUCTS
Middletown, N. Y.

POWER HACK SAW BLADES
HAND HACK SAW BLADES
HACK SAW FRAMES
BAND SAW BLADES
HOLE SAWS
FILES

For more data circle 342 on Postpaid Card

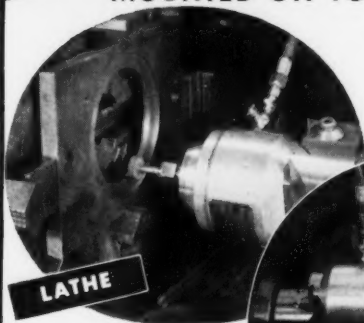
REDUCE Precision Hole Grinding Costs USING AN

ONSRUD

D1-S

JIG AND HOLE GRINDER

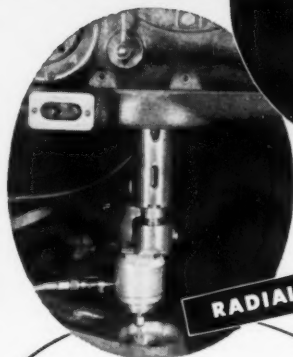
MOUNTED ON YOUR



LATHE



MILLING MACHINE



RADIAL DRILL

OR MOUNT ON JIG BORER
TO CONVERT MACHINE
TO PRECISION
JIG GRINDER



1/4 HP
50,000
RPM
AIR
TURBINE
GRINDER
•
SLIDE
ADJUSTS
TO
0.0001"

Grind precision holes at amazingly low costs with the D1-S . . . using your present machine tools. A completely RIGID unit guaranteed not to deflect in its vertical alignment. Grease-shielded, long life bearings. Capacity up to 2 3/4" diameter with 3/4" wheel . . . and up to 4" diameter with adapter. Required high speed and power for dependable, fast operation on even the most difficult applications.

ONSRUD MACHINE WORKS, INC.
7738 LEHIGH AVENUE, NILES 48, ILL.
(Suburb of Chicago)

WRITE FOR FREE D1-S HOLE GRINDER BULLETIN 1126

For more data circle 343 on Postpaid Card

Announcing the *Van Kewren* THREAD RING COMPARATOR

It does the job
FASTER and EASIER
than rings
AT LESS COST



*If
you use
THREAD
RING GAGES
in your
production line,
the new
VAN KEUREN
THREAD RING
COMPARATOR
will dispense
with many gages
and much
labor cost —
in providing
quick, accurate
and repetitive
measurements.*



THE *Van Kewren* CO.
Since 1920

175 Waltham Street, Watertown 72, Mass.
PRECISION MEASURING TOOLS
... rated the world's most accurate

Plug Gages · Measuring Wires · Optical Flats and Light Wave
Equipment · Gage Blocks · Precision Lapping Service and Parts

For more data circle 344 on Postpaid Card

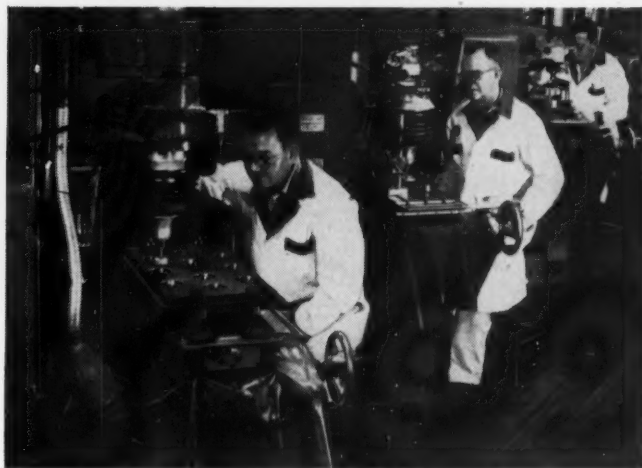
Visit Us
in Booth
1105
at the
ASTE Show

Val Koller tells why he continually adds more Moore Jig Borers and Jig Grinders to his team

This is another in a series featuring the views of owners of leading tool and die companies.



by **VAL KOLLER**
President
Koller Die & Tool Co.,
Milwaukee, Wisconsin
Manufacturer of Dies
and Metal Stampings—
Tools—Jigs—
Fixtures and Gages—
Special Machines



Moore equipment in Koller plant, with new #3 Jig Grinder in foreground.

"Since our foundation in 1919 it has been my personal objective to strive for perfection. Since that time perfection has evolved into a .000010" word for tool and die makers. Such precision is rapidly becoming common-place...particularly in electronics and guided missile fields of production. With the installation of Moore equipment in 1950, we have been able to compete successfully in a caliber of work that before was not possible.

"Since that initial investment in a Moore Jig Grinder we have continually added Moore teammates to our toolroom. Today we operate more Moore equipment than any other top contract shop in the greater Milwaukee area.

"The tolerances and intricate contours now required make Moore Jig Borers and Jig Grinders a must in each toolroom. These machines operate at full capacity each workday with negative downtime due to mechanical failures. In fact, we have found that it costs real dollars and cents to operate without Moore equipment.

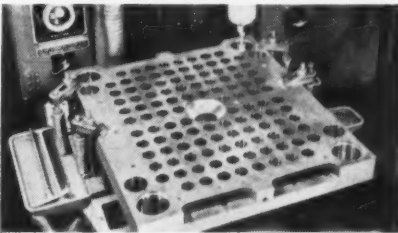
"This cost factor is just one of many reasons why

we recently added another teammate to our toolroom...the new Moore Model #3 Jig Grinder. This machine, with its tenth-splitting accuracy, hardened ways and wider range, enables us to service more customers better."

Write today for literature describing the unique features of #3 Moore Jig Borers and Jig Grinders or see our catalog in SWEET'S MACHINE TOOL FILE.

MOORE SPECIAL TOOL COMPANY, INC.

730 Union Avenue, Bridgeport, Connecticut



This 116 cavity mold plate was completely jig ground at Koller on a Moore Jig Grinder. Tolerances: hole location $\pm .0001$ ", hole diameter $\pm .0001$ ".



HOLES, CONTOURS AND SURFACES,
tells how to produce tools and
dies the modern way
424 pages,
495 illustrations.
\$5 in U.S.A.
\$6 elsewhere.

ADD

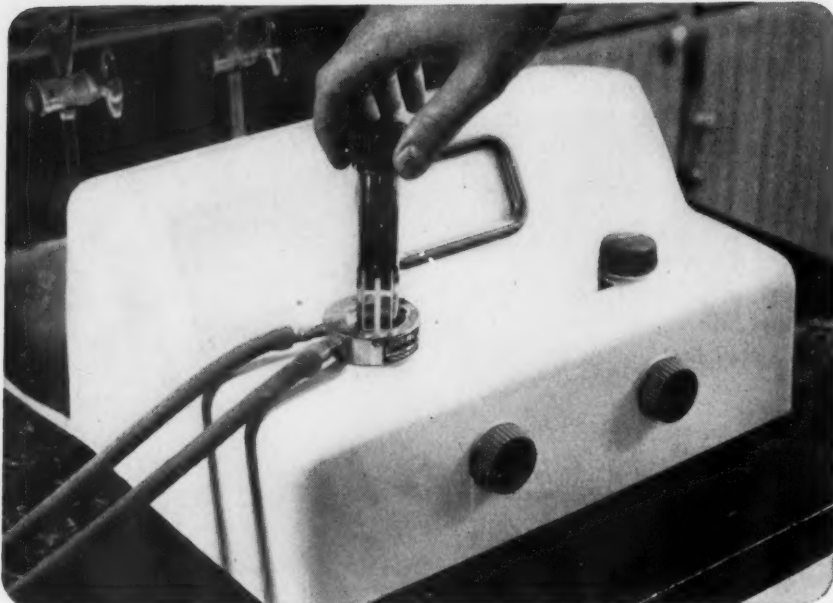


TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTOGRAPH WHEEL DRESSERS • PRECISION ROTARY TABLES • HOLE LOCATION ACCESSORIES

For more data circle 345 on Postpaid Card

Experience—the added alloy in Allegheny Ludlum tool steels



COLORIMETER (inherently extremely accurate) determines percentages of molybdenum, tungsten, cobalt and manganese in A-L tool steel to insure consistent, high quality.

Colorimeter measures exact chemical composition of Allegheny Ludlum tool steel melts

Accurate adjustment of alloys guarantees uniform heat treatment, predictable dimensional changes, reduced grinding, standardized machining operations.

Close control of molybdenum, tungsten, cobalt and manganese is at the heart of a good tool steel melt. In addition to the usual testing methods, Allegheny Ludlum's chemical laboratory checks these metals with Colorimetry because of its inherent, extreme accuracy.

On the basis of the Colorimeter's findings, it is possible to make carefully calculated furnace additions of ferro-alloys, insuring precise control over chemistry. This guarantees your receiving the *exact* analysis order after order, providing *uniformity of heat treatment, predictable dimensional changes, reduced grinding and standardized machining operations*.

NEWTEXT

Colorimetry is but one step toward careful control over composition. Allegheny Ludlum also sets exacting purchasing specifications on raw materials and scrap. Quality Control checks all incoming orders to see that they conform with these specifications. Another guard toward your getting your exact specifications: each ingot bears a metal tab showing heat number.

Allegheny Ludlum stocks a complete line of tool steel sizes and grades. Call your nearest A-L representative; you'll get quick service and counsel on such problems as heat treating, machining, grade selection, etc. Or write for A-L's publication list which gives full data on the more than 125 technical publications offered. They'll make your job easier.

ALLEGHENY LUDLUM STEEL CORPORATION,
Oliver Bldg., Pittsburgh 22, Pa. Address Dept. MS-4.

ALLEGHENY LUDLUM

Tool Steel warehouse stocks throughout the country... Check the yellow pages
every grade of tool steel... every help in using it



For more data circle 346 on Postpaid Card

MORSE TOOLS HELP BUILD CHARACTER FOR EIMCO



... Morse tough tools cut smooth, fast holes... help speed production of mining machines with guts.

For rough, rugged power, you can't beat Eimco mining machines. They move rock and ore... carry them up steep grades quickly and easily.

It takes tough tools to make these rugged machines. It takes Morse Cutting Tools... the toughest on the market. They cut smoother, faster — and last longer.

Let Morse help you make your tough jobs easy. Call your Morse-Franchised Distributor today. He'll give you the story.

MORSE

means "THE MOST" in Cutting Tools

MORSE TWIST DRILL & MACHINE CO., NEW BEDFORD, MASS.

Warehouses in:

NEW YORK • CHICAGO • DETROIT • DALLAS • SAN FRANCISCO



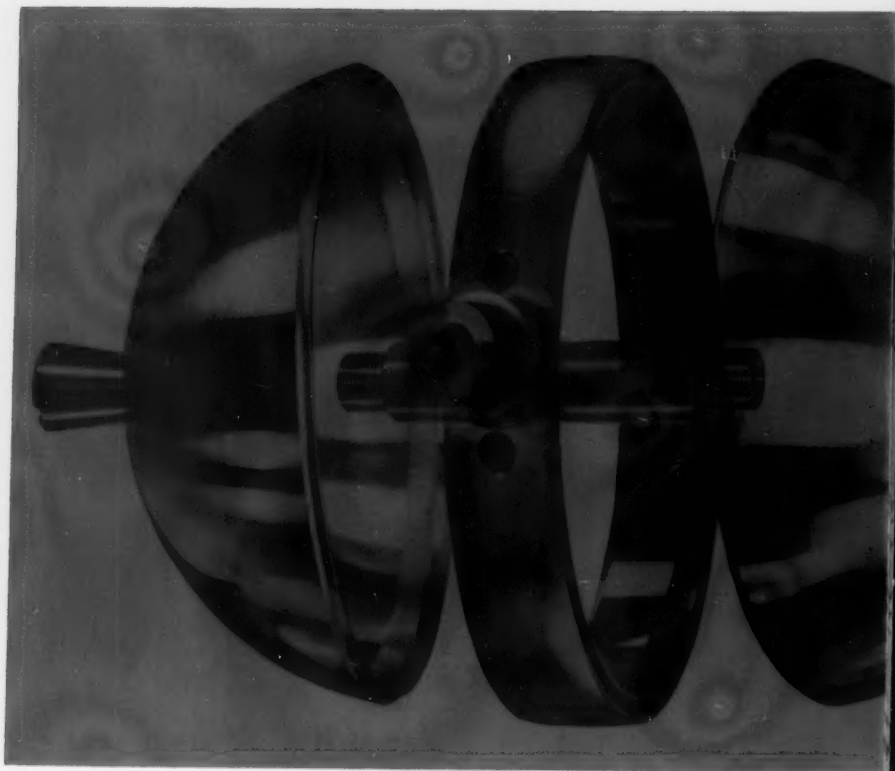
Morse means more production... smoother, more accurate production... with every type of cutting tool from drills, reamers, taps and dies, to end mills, milling cutters, slitting saws and "specials". So, if you want the best from every cutting tool you buy, mark your order "MORSE". For if you want Morse Quality, there's only one way to get it... specify Morse.



A Division of VAN NORMAN INDUSTRIES, INC.

⊕ 2297

For more data circle 347 on Postpaid Card



PRECISION:

Reason enough

Beryllium specialists, Leemath Incorporated of Long Island, create delicate and precise mechanisms in this high strength but toxic and abrasive wonder metal. In their temperature-controlled shop, this feather-light gyro float assembly (shown actual size, right) was turned on a special high-precision LeBlond Dual-Drive Lathe. *Sphericity had to be concentric with the two major axes within .0005" total indicated runout of 1.8750"!* (In order to hold the assembly that close, component tolerances had to be even tighter!)

To perform such touchy work, Leemath ordered their LeBlond 15" Dual-Drive to ultra-high precision standards. For this lathe Timken furnished specially-made bearings with one-

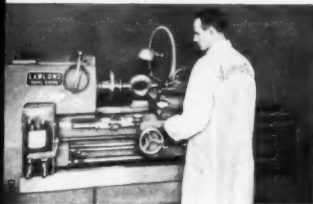
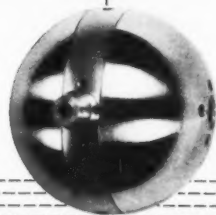
third the runout of their finest precision class. With it came the standard features that give LeBlond its reputation for long-lived precision—combination gear-belt drive headstock with 16 speeds, 31 to 2400 rpm; compensating vee bed way construction with hardened steel shears; thrust-lock tailstock; and many more.

People buy lathes for many reasons. But when, like Leemath, they must have precision they can depend upon, that is reason enough to buy LeBlond.

If you would like to have the full story of LeBlond's Dual-Drive, ask your distributor or write for Bulletin 6A.



to buy LeBlond



LeBLOND
of Cincinnati

THE R. K. LeBLOND MACHINE TOOL COMPANY
Cincinnati 8, Ohio

April, 1960

For more data circle 348 on Postpaid Card

MODERN MACHINE SHOP

35

For fast, easy precision angular set-ups . . . Magna-Lock SINE CHUCKS and PLATES

ELECTRO-MAGNETIC TYPE

Exclusive laminated top plate. Circular locking take-up on hinge rolls for continuous accuracy. All-steel, moisture-proof. Uniformly distributed holding power.

PERMANENT MAGNET TYPE

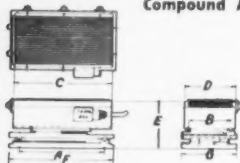
Low height, light weight, positive holding power.

HARDENED STEEL SINE PLATES

Completely stabilized. Circular locking take-up. Tapped holes for clamping work.

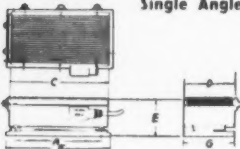


Compound Angle Sine Chuck



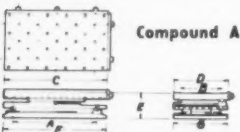
MODEL	(SINE) A	(SINE) B	C	D	E	F	G	PRICE
ELECTRO-MAGNETIC								
DA-5	5,000	5,000	6½	6	5¼	7¼	6½	\$ 445.00
DA-10	10,000	5,000	11½	6	5¼	12¼	6½	590.00
DA-1010	10,000	10,000	11½	10	5¼	12¼	10½	1,180.00
DA-20	20,000	5,000	21½	6	5¼	22¼	6½	1,400.00
PERMANENT MAGNET								
DP-5	5,000	5,000	6	6	5¼	7¼	6½	445.00
DP-10	10,000	5,000	12	6	5¼	12¼	6½	590.00

Single Angle Sine Chuck



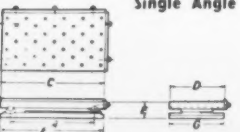
MODEL	(SINE) A	C	D	E	F	G	PRICE
ELECTRO-MAGNETIC							
SA-5	5,000	6½	6	4½	7¼	6½	\$310.00
SA-10	10,000	11½	6	4½	12¼	6½	390.00
SA-1010	10,000	11½	10	4½	12¼	10½	775.00
SA-20	20,000	21½	6	4½	22¼	6½	950.00
PERMANENT MAGNET							
SP-5	5,000	6	6	3½	7¼	6½	310.00
SP-10	10,000	12	6	3½	12¼	6½	390.00

Compound Angle Sine Plate



MODEL	(SINE) A	(SINE) B	C	D	E	F	G	PRICE
DA-5P	5,000	5,000	6½	6½	3¾	7¼	6½	\$ 430.00
DA-10P	10,000	5,000	11½	6½	3¾	12¼	6½	565.00
DA-1010P	10,000	10,000	11½	11	3¾	12¼	11	1,050.00
DA-20P	20,000	5,000	21½	6½	3¾	22¼	10½	1,350.00

Single Angle Sine Plate



MODEL	(SINE) A	C	D	E	F	G	PRICE
SA-5P	5,000	6½	6½	2¼	7¼	6½	\$280.00
SA-10P	10,000	11½	6½	2¼	7¼	6½	380.00
SA-1010P	10,000	11½	11	2¼	12¼	11	750.00
SA-20P	20,000	21½	6½	2¼	22¼	6½	920.00

Order now for prompt delivery

MAGNA-LOCK, INCORPORATED

BIG RAPIDS, MICHIGAN, U.S.A.

For more data circle 349 on Postpaid Card

WHY WAIT?

DELIVERY FROM STOCK**SPECIAL RH &**

TAPS • DIES • THREAD PLUG & RING GAGES

**DEALER
INQUIRIES INVITED**

[illegible]

	THIRDS PER INCH
198	24
2	24-28-30-32-36-40
7	24-28-32-36-40-44-48
232	24-28-32-36-40-44-48-56-60-64
737	24-28-32-36-40-44-48-56-60-64-72
15/64	20-22-24-26-28-30-32-36-40
7/64	20-24
1/4	10-12-14-16-18-22-24-28-30-32-36-40-44-48-50-56-60-64-72-80
9/32	12-18-20-24-26-27-28-32-36-40-44-48-56-60-64-72-80
7/32	16-18-20-24-26-27-28-32-36-40-44-48-56-60-64-72-80
3/16	18-24
190	18-24
5/16	10-12-14-16-18-20-22-26-27-28-30-32-36-40-44-48-56-64
21/64	16-18-20-24-26-27-28-32-36-40-44-48-56-60-64
11/32	16-18-20-24-26-27-28-32-36-40-44-48-56-60-64
23/64	16-24
3/8	16-24
365	10-12-14-18-20-22-26-27-28-30-32-36-40-44-48-56-64
25/64	14-16-18-20-24-27-32-40-48-56
40/	12-14-16-18-20-24-27-28-32-36-40
13/32	12-14-16-18-20-24-27-28-32-36-40
7/16	10-12-14-16-18-20-24-27-28-32-36-40
27/64	10-12-14-16-18-20-24-27-28-30-32-36-40-44-48-56
19/32	12-14-16-20
25/64	12-14-16-20-24-27-28-32-36-40-44-48-56-60-64
1/2	12-14-16-18-20-22-24-26-27-28-30-32-36-40-44-48-56-60-64-72-80
3/4	16-20-24-28-32-36-40-44-48-56-60
13/64	12-14-16-20
5/32	10-12-13-14-16-18-20-24-27-28-32-40-44-48
17/32	24
9/16	10-13-14-16-20-24-27-28-30-32-36-40-44-56-80
37/64	12-14-16-20-24-28-32-36-40
19/32	8-16-20-24-28-32-36-40
5/8	27-28-30-32-36-40-44-48-56-64

SIZE	THREADS PER INCH
41/64	11-18-24
21/32	10-11-12-14-16-24-32-40
11/16	10-11-12-14-16-18-20-22-24-27-32-36-40
23/32	11-12-16-18-20-24-27-32
47/64	10-12-16-20-24
3	8-9-11-12-14-15-18-20-22-24-26-27-32-36-40-48
49/64	10-16-20-24
5	10-12-16-18-24-27-32-40
800	10-12-16-18-20-24-27-32-40
11/8	8-10-12-14-16-18-20-24-27-32-40
835	10-12-16-18-20-24-27-32-40
57/64	6-12
22/32	8-10-12-16-24-27-32-40-48
7/8	8-10-11-12-13-16-18-20-24-26-27-32-36-40
29/32	8-10-12-14-16-18-20-24-26-27-32-36-40
15/16	8-9-10-12-14-16-18-20-24-26-27-32-40
21/16	8-10-12-16-20-24-28-32
1	5-7-9-10-12-16-18-20-24-26-27-32-36-40-48
1-1/32	8-12-14-16-18-20-24
1-1/8	12-14-16-18-20-24
1-1/16	7-9-10-12-14-16-17-18-20-24-27-32-40
1-3/32	7-12-14-16-18-20-32
1-1/8	8-10-14-16-18-20-24-27-32
1-1/4	8-10-12-14-16-18-20-24-32
11	18
1-1/16	7-10-12-14-16-18-20-24-27-32-40
1-1/8	8-10-14-16-18-20-24-27-32-40
1-1/4	8-10-12-14-16-18-20-24-27-32-40
1-1/16	7-10-12-14-16-18-20-24-27-32-40
1-3/8	5-8-10-14-16-18-20-24-27-32
1-1/32	12-16-18-20
1-7/16	8-10-12-14-16-18-20-24-27-32-40

SIZE	THREADS PER INCH
1-7/8	8-10-12-14-16-18-20-24-27-28-32-40
1-17/32	7-12-16-18-20-24-32-40
1-5/8	6-8-10-12-14-16-18-20-24-32-40
1-5/8	5-5 1/2-6-8-10-11 1/2-12-13-14-16-18-20-24-28-32-40
1-11/16	8-10-12-14-16-18-20-24-32-40
2-23/32	5-5 1/2-6-8-10-12-14-16-18-20-24-32-40
2-1/8	4-6-8-10-12-14-16-18-20-24-32-40
1 7/64	8-10-12-14-16-18-20-24-32-40
1 7/16	8-10-12-14-16-18-20-24-32-40
1-13/16	8-10-12-14-16-18-20-24-32-40
1-7/8	5-8-10-12-14-16-18-20-24-32-40
1-29/32	12-16-18-20-32
1-15/16	8-10-12-14-16-18-20-24-32-40
2-1/8	8-10-12-14-16-18-20-24-32-40
2-1/16	8-10-12-14-16-18-20-24-32-40
2-3/16	8-10-12-14-16-18-20-24-32-40
2-1/4	8-10-12-14-16-18-20-24-32-40
2-5/16	8-10-12-14-16-18-20-24-32-40
2-3/8	8-10-12-14-16-18-20-32
2-1/2	6-8-10-12-14-16-18-20-32
2-1/2	6-8-10-12-14-16-18-20-32
2-9/16	8-10-12-14-16-18-20
2-5/8	8-10-12-14-16-18-20-32
2-11/16	8-10-12-14-16-18-20-32
2-3/4	8-10-12-14-16-18-20-32
2-7/8	8-10-12-14-16-18-20-24-32
2-15/16	8-10-12-14-16-18-20-32
3-1/8	8-10-12-14-16-18-20-24-32
3-1/16	8-10-12-14-16-18-20-24-32
3-7/8	8-10-12-14-16-20
3-1/2	8-10-12-14-16-20
3-1/2	8-10-12-16
3-1/2	8-10-12-16
3-1/2	8-10-12-16
3-7/8	8-10-12-16
3-7/8	8-10-12-16
4-1/8	8-10-12-16
4-1/8	8-10-12-16
4-1/8	8-10-12-16

Measure from
stock up
to 6" dia.

LEFT HAND N.C. (USS)—N.F. (SAE) SIZES
SEE ABOVE SECTION FOR MORE SIZES

SIZE	THREADS	SIZE	THREAD
0	30	8	32-36
1	64-72	10	24-32
2	56-64	12	24-28
3	48-56	14	20-24
4	36-40-48	1 1/4	20-28
5	40-44	5/16	16-24
6	32-40	3/8	12-24



Right & Left Hand—Unlisted 'Gun' or Spiral Pointed Taps

Size	Threads	Size	Threads
0	56 NS	7/8	9 NC, 14 N
2	56 NC, 64 NF	1 1/8	8 NC, 12-14 N
9/16	12 NC, 18 NF	1 1/8	7 NC, 12 N
5/8	11 NC, 18 NF	1 1/4	7 NC, 12 N
11/16	11 NC, 16 NS	1 3/8	6 NC, 12 N

THREADS		SIZES		THREADS	
7/16	14-20	1"	8	8-12-14	
1/2	13-20	1-1/8	7-12		
9/16	12-18	1-1/4	7-12		
5/8	11-18	1-5/8	6-12		
3/4	10-16	1-3/4	6-12		
7/8	9-14	1-7/8	6-12		
		2"	6-12		

Random Hand—Unlisted 'Pulley' And Extra Length Taps

SIZES		THREADS		THREADS	
4	36-40 NC, 48 NF	3/8	24 NF		
5	40 NC, 48 NF	7/16	20 NF		
6	32 NC, 40 NF	1/2	20 NF		
8	24 NC, 32 NF	9/16	12 NC		
10	24 NC, 32 NF	9/16	18 NF		
12	24 NC, 28 NF	5/8	18 NF		
14	24 NF	3/4	16 NF		
1/4	28 NF	Also Larger			

'OVERSIZE' and 'UNDERSIZE' TAPS

RIGHT AND LEFT HAND N.C. AND N.F. SIZES			
MACHINE SCREW	±2 to ±5	Plus or Minus	.002, .003, .005
MACHINE SCREW	±6 to ±14	Plus or Minus	.003, .005, .010
FRACTIONAL	1/4" to 1-1/2"	Plus or Minus	.003, .005, .010 .015, 1/64, 1/32

Right & Left Hand—Unlisted 'Gun' or Spiral Pointed Taps

Size	Threads	Size	Threads
1	56 NS	7/8	9 NC, 14 N
2	56 NC, 64 NF	1-8	NC, 12-14 N
9/16	12 NC, 18 NF	1-1/8	7 NC, 12 N
5/8	11 NC, 18 NF	1-1/4	7 NC, 12 N
11/16	11 NS, 16 NS	1-3/8	6 NC, 12 N
1/2	10 NC, 16 NF	1-1/2	6 NC, 12 N

Rand Hand—Unlisted 'Pulley'

And Extra Length Taps					
Size	Threads		Size	Threads	
3/4	36-40 NC	48 NF	3/8		24 NF
5	40 NC	44 NF	7/16		20 NF
6	32 NC	40 NF	1/2		20 NF
8	32 NC	36 NF	9/16		12 NC
10	24 NC	32 NF	9/16		18 NF
12	24 NC	28 NF	5/8		16 NF
1 1/4		28 NF	3/4		18 NF
1 1/2		24 NF	Also Larger Sizes, NC & NF		

UNLISTED
Right Hand "Bico" Tee

"NPT"		"NPS"		EX. LENG.	
Taper	"NPT"	Size	Thread	"NPT"	"NPS"
1/16	27	1/16	27		
1/4	27	1	8		
1/2	8	1-1/4	11 1/2	1/16	27
3/4	8	1-1/2	11 1/2	1/4	27
1	8	2	11 1/2	3/8	18
1-1/2	8	2-1/2	8	1/2	18
2	8	3	8	3/4	18
2-1/2	8	3-1/2	8	1	18
3	8	4	8	1-1/4	18

Lefthand 'Pipe Taps'

TH	aper and Straight		TH	aper and Straight	
G	Size	Thread	G	Size	Thread
Head	1/16	27	1	1 1/4	11 1/2
7	1/8	27	1 1/2	1 1/2	11 1/2
7	1/4	18	1 3/4	1 3/4	11 1/2
8	3/8	18	2	2 1/2	8
8	1/2	14	2 1/2	2 1/2	8
4	3/4	14	3	3	8
11			3 1/2	3 1/2	8

ACME TAPS IN STOCK



IF NOT IN STOCK—7 to 10 DAYS DELIVERY—When ordering or requesting quotations, kindly furnish following information:

- (a) Kind of material being machined.
- (b) Depth of hole in inches, through or bottom.
- (c) Tap to be used horizontally or vertically.
- (d) Will tap turn, or is piece expected to be turned.
- (e) Is tapping job expected to be done in one pass.
- (f) Would tap be backed out of hole, or machined stopped for release of tap.
- (g) If possible, submit thread length, and overall length of tap desired with blue print.

SPECIAL REAMERS

Immediate Delivery



H.S.S. Machine Reamers
Decimal, Fractional, Letter,
and Wire Gauge Sizes
Prices On Application

**SPECIAL—Right Hand High Speed
"EXTRA LENGTH DRILLS"
"AND LEFT HAND DRILLS"
In Stock for Immediate Delivery**

Get all 3...

- ☒ DELIVERY
- ☒ QUALITY
- ☒ PRICE



FIELD TOOL SUPPLY CO.

Industrial Cutting Tools
11 S. DESPLAINES ST., CHICAGO 4, ILL.
All Phones: Financial 4-1195

The Largest Stock of
Special and Standard
Taps, Dies, Plug Gages

For more data circle 350 on Postpaid Card

LITTLE LATHE

Large Savings

Lodge & Shipley Hi-Turn
45° COPYMATIC Lathe



"\$10,000 Saved is \$10,000 Earned!"

A too-big, too-expensive lathe doesn't mean you'll do the job quicker, better or at lower cost. The Lodge & Shipley 1307 (10") HI-TURN 45° COPYMATIC Tracer Lathe is priced lower, by as much as \$10,000, than conventional lathes of equal or less capacity . . . and that's just the start of savings!

Building the HI-TURN exactly to production requirements, Lodge & Shipley eliminates the leadscrew and all its complicated gearing. The result is a rugged lathe at exceptionally low cost with high accuracy and productive capacity.

If you perform manufacturing or tracer lathe operations, it will pay you to investigate the many features of the low-cost HI-TURN Lathe.

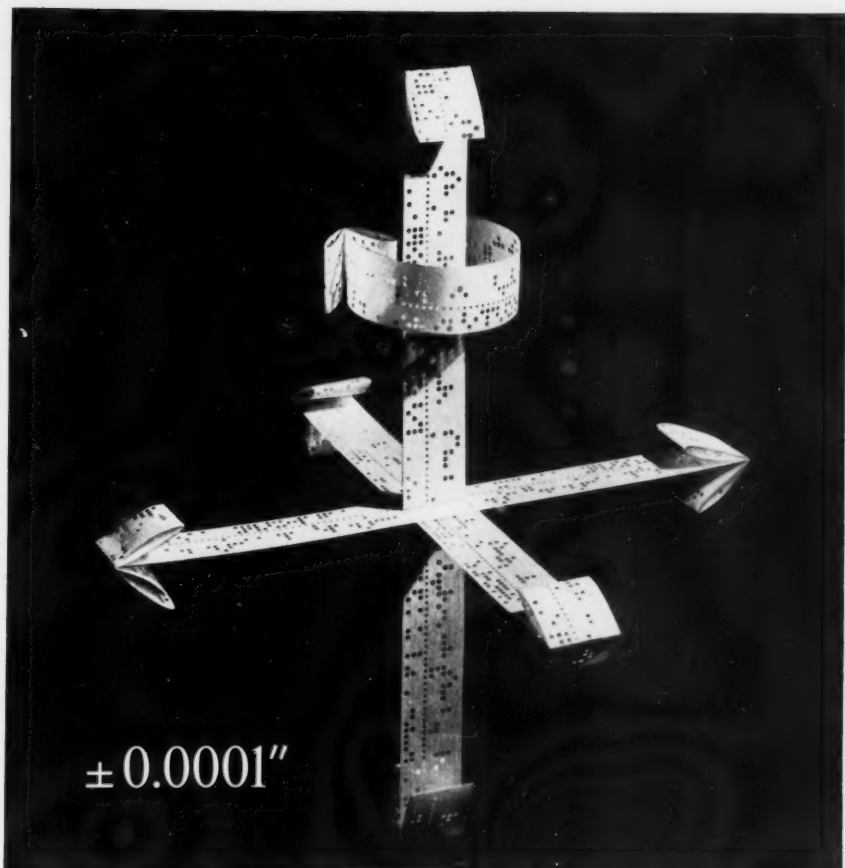
This "little lathe" has proved itself as a "big producer"—gives you productive capacity matched to the job. Available in Production or 45° Tracer models. Write for information: Dept. HL-106, The Lodge & Shipley Co., 3058 Colerain Ave., Cincinnati 25, Ohio.

- 5 HP at all speeds—9 geared speeds up to 3000 RPM
- Designed for heavy feeds
- Special spindle bearings require no warm-up period
- Famous elliptical girth bed
- Super rigid base—requires no special foundation
- Flame hardened and ground replaceable steel bedways
- Hardened and ground cross slide ways
- Allows machining, with a continuous cut, of almost any combination of normal lathe operations

Your **LODGE-ical** Choice for Profitable Production

Lodge & Shipley

For more data circle 351 on Postpaid Card



$\pm 0.0001''$

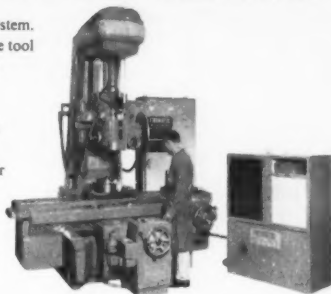
PRECISION BORING: Control gains a Third Dimension!

Now Fosdick adds Numerical Depth Control to its unique positioning system. Another loophole for error in precision boring has disappeared. Watch the tool drive smoothly to depth, boring a hole with finer finish, precise in depth and location. Watch the tool advance and retract quickly, saving time. *Tape or dial any depth. Absolutely no stops to preset.*

See how this control signals every tool change and compensates for tools of random length. It was planned when the Fosmatic precision boring machines were designed, so that it fits and takes no extra space. Consider what this new dimension in control means to your critical production jobs. Write for catalog PB-W.

FOSDICK

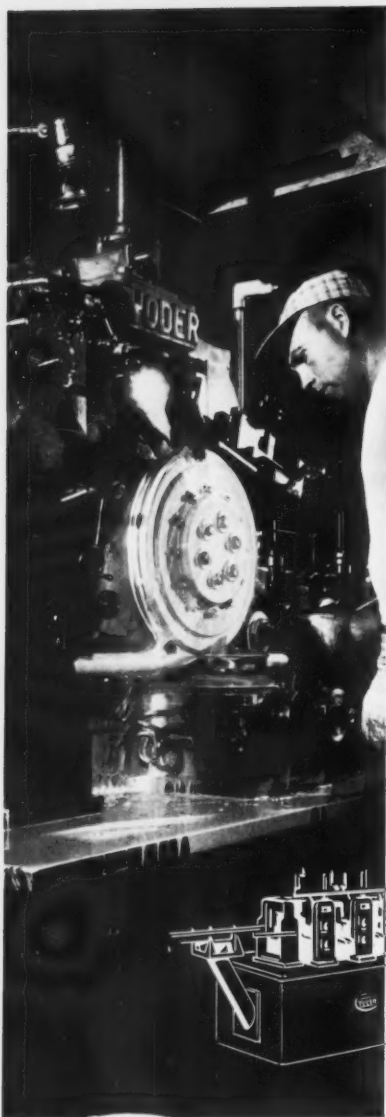
THE FOSDICK MACHINE TOOL COMPANY
Cincinnati 23, Ohio



For more data circle 352 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 39



Yoder Tube Mills speed tailpipe production at AP Parts Corporation

The AP Parts Corporation (Toledo, Ohio), world's largest producer of replacement mufflers and tailpipes, uses 2 YODER Tube Mills to produce more than 300 ft. of 1 3/4", 1 1/2" and 2" tubing per minute.

According to Mr. John Grindle, Plant Engineer, the two-man operated YODER Mills are vital to the production of the entire plant. "YODER Tube Mills earn their keep daily. They are easy to set up, maintain and operate . . . the welds are clean and uniform. We depend on them for constant quality, high production and minimum downtime".

The YODER Tube Mills at AP Parts exemplify the production economies and dependability of all YODER-built equipment, whether it be Pipe and Tube Mills, Cold Roll-Forming Machinery or Slitting Equipment.

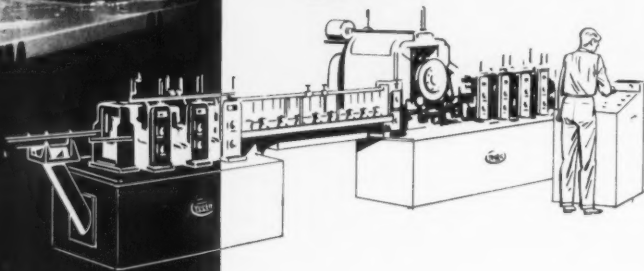
If your products require ferrous or non-ferrous pipe or tubing, from 1/4" to 26" diameters, there is a YODER Mill designed to produce it economically, accurately and efficiently.

THE YODER COMPANY

5532 Walworth Avenue • • • Cleveland 1, Ohio



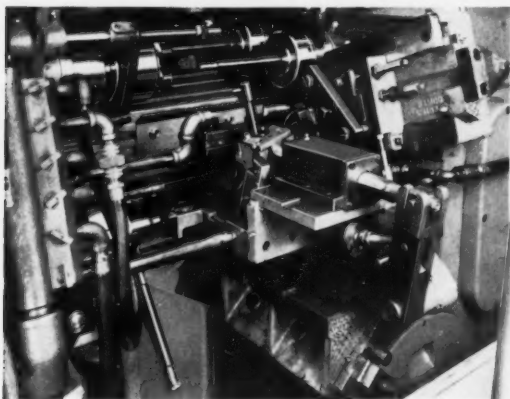
For complete information on YODER Pipe or Tube Mills . . . write for the fully illustrated, 88 page YODER Tube Mill Book . . . it is yours for the asking.



PIPE AND TUBE MILLS (ferrous or non-ferrous)
COLD ROLL FORMING MACHINES
ROTARY SLITTING LINES

For more data circle 353 on Postpaid Card

3/4-16 thread is cut in 3rd position, 3/4-10 in 4th. Piece is rotated end-for-end by transfer attachment.



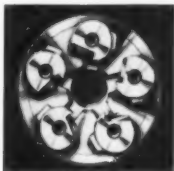
Lead-Screw Threading To Tenths of Thousandths ... With National Acme 5-Chaser Vers-O-Tools

"Run-out, pitch diameter and pitch variation of the threads on these 3/4-inch studs can't be off more than 1/1000 inch. And, the overall tolerance of the finished piece must necessarily be held to tenths of thousandths." These were the exacting threading requirements of one of the country's leading builders of diesel electric locomotives. 4-chaser heads had failed to meet specifications. But National Acme 5-Chaser Vers-O-Tools, on an Acme-Gridley RB-6 Automatic, arranged for a double-index setup, met the critical threading requirements with ease, producing consistently superior threads at lower cost.

Thousands of users of Namco 5-Chaser Vers-O-Tools have realized similar cost-savings. Here's why . . .

- Out-of-round and drunken threads are eliminated
- Chasers can be ground closer to center, giving smoother, more accurate threads
- 5 chasers lighten chip load on each tool
- Longer chaser life per grind—less machine downtime
- 5 chasers permit threading of parts with flats, slots, keyways

Write for complete information on how Namco 5-Chaser Vers-O-Tools can provide the tolerances and finish for your toughest threading job.



National Acme

THE NATIONAL
ACME COMPANY
182 E. 131st STREET
CLEVELAND 8, OHIO

Sales Offices: Newark 2, N. J., Chicago 4, Ill., Detroit 27, Mich.

For more data circle 354 on Postpaid Card

April, 1960

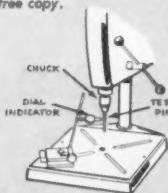
MODERN MACHINE SHOP

41

A
SHOP SUGGESTION
FROM
SUPREME

HOW TO TEST A CHUCK
FOR ACCURACY...

Supreme publishes an Engineering Catalog that gives exact information on testing a chuck for accuracy. This catalog defines and guarantees each Supreme Chuck's runout limits. Write for your free copy.



In the meantime, you can make an accuracy test by this method: Fit a hardened test pin into the chuck. Clamp a dial indicator to the machine so that its point touches the test pin an inch or more below the chuck. If runout is indicated, remove the chuck and repeat test on the arbor or spindle to determine the offending part.

Dirt or chips in the chuck arbor hole can cause runout; so can bent spindles or loose bearings. Look for the real cause.



For fastest,
most dependable
service . . .
order from
your LOCAL
Distributor

Tool room accuracy
for production line use

Supreme
BRAND
Chucks

SUPREME PRODUCTS CORPORATION

DIV. OF A-S-R PRODUCTS CORP. 2222 SOUTH CALUMET AVENUE - CHICAGO 16, ILLINOIS

For more data circle 355 on Postpaid Card

Here's Why Accurate Honing Is Easier On The New Barnesdril Model 244...



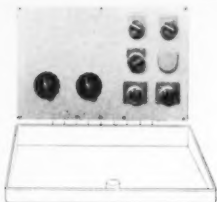
Hone Feed—simple dial gives infinite adjustment.



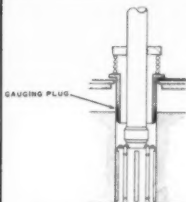
4-Speeds—turn of knob selects desired speed rate.



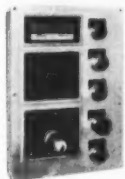
Reciprocation—length of stroke selected by convenient dial.



Set-Up—controls under lock and key.



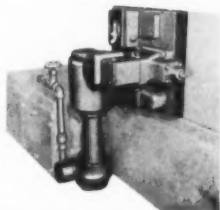
Plugmatic—automatic sizing assures accuracy within .0002".



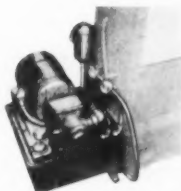
Operating Controls—mounted at shoulder height.



All Electric Controls—enclosed inside machine column.



Coolant Pump and Hydraulic Valves—easily accessible.



Hydraulic Pump—in open, for easy maintenance.

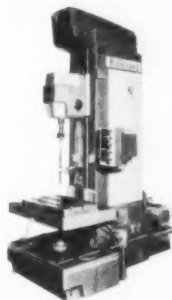
Barnesdril offers a completely new honing machine for high production honing of bores $\frac{1}{2}$ " to 6" in diameter. Large diameter applications depend upon amount of stock removal, bore length, and material. Machine is available with one or two spindles and a choice of three stroke lengths: 15", 25", or 40". For complete details see your Barnesdril representative or write for new bulletin H-112 today!

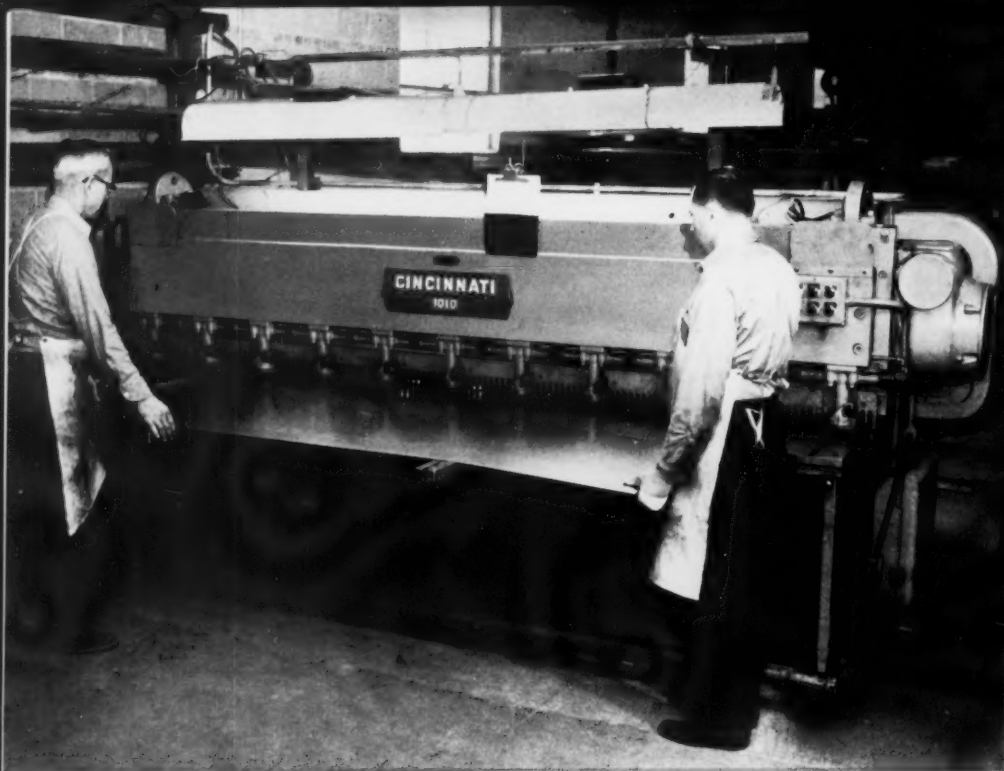


BARNES DRILL CO.

860 CHESTNUT STREET • ROCKFORD, ILLINOIS
DETROIT OFFICE: 13121 Parlane Avenue

For more data circle 356 on Postpaid Card



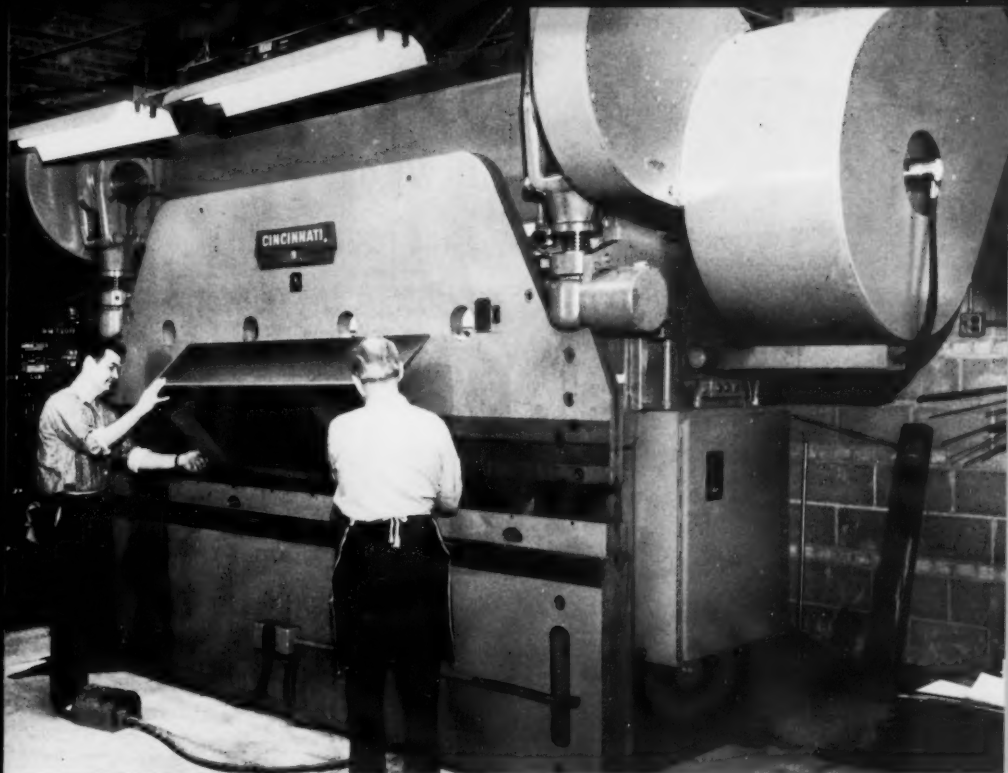


CINCINNATI® PRESS BRAKE AND SHEAR

“cut our

“The Cincinnati equipment in our shop is the best in our operation,” according to Sal Rochi of G. & M. Metal Fabricators, Franklin Park, Ill. Their Cincinnati Press Brake and Shear help make a wide variety





Courtesy G. & M. Metal Fabricators, Inc.

operating time"

of sheet metal products (radio chassis, boxes, cabinets, lighting fixtures, etc.).

"Our Cincinnati Press Brake with Automatic Cycle has cut our operating time in forming and perforating," says Rochi. "The

Cincinnati Shear gives us sure accuracy for all our parts, from brackets to cabinets."

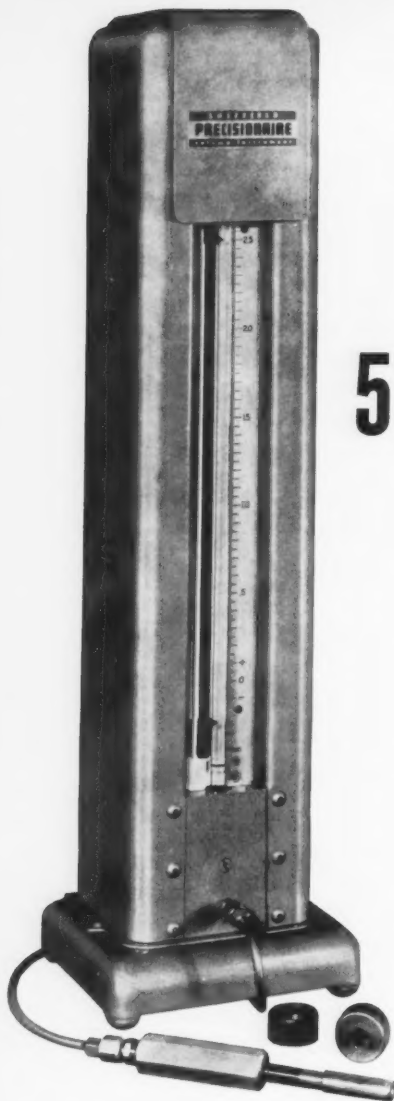
Call your nearby Cincinnati representative today; he'll show you how to cut your costs in forming, punching, and shearing.

THE CINCINNATI SHAPER CO.

Shapers / Shears / Press Brakes / Cincinnati 11, Ohio, U. S. A.

For more data circle 357 on Postpaid Card

In Scotland: The Cincinnati Shaper Co., Ltd., Glasgow



New Long-Range 15" Precisionaire® Column Instrument Now backed by **5 Year Warranty**

For all cost-conscious gage buyers, Sheffield's new 5-year Quality and Reliability Warranty on Precisionaire Column Instruments shipped with Sheffield gaging tooling is important news. In addition, 15" Precisionaire Column Instruments are now supplied in multi-column models, with 5000 to 1 and 10,000 to 1 amplifications. (Higher amplifications up to 100,000 to 1 obtained with Super-Amp Package.)

This instrument doubles gaging range, cuts initial gage cost, reduces gage inventory and upkeep.

You can inspect wider part tolerances at higher amplification with greater accuracy and speed.

You can classify parts into more size increments with a wider scale spread for each class—fewer borderline cases.

You can better control in-process gaging because of greater approach or "come-up" range.

Amplification of Plunjet® gaging cartridges is doubled and full amplification is obtained when gaging small diameters.

Call your local Sheffield representative for a demonstration or write Dept. 12.

The

SHEFFIELD

Corporation

Dayton 1, Ohio

A subsidiary of the Bendix Aviation Corporation

Gages, Measuring Instruments, Automatic Gaging & Assembly Systems • Machine Tools • Contract Mfg.

For more data circle 358 on Postpaid Card

**Accuracy... finish
long tool life...
high surface finish
Accuracy... high
surface finish
long tool life**



STANDARD END MILLS

For high production
machining operations.

- | | | |
|---|---|--|
| 1. SINGLE-END
Short . . . Standard . . . Long. | 4. MULTIPLE-FLUTE
Taper Shanks. | 7. BALL-END
Single and Double-End. |
| 2. DOUBLE-END
Short . . . Standard . . . Long. | 5. TAPER SHANKS
Two Flute. | 8. CARBIDE TIPPED
Single-End. |
| 3. TWIN-DRIVE
Single End . . . Straight Shank. | 6. STRAIGHT SHANKS
Two and Four Flute. | 9. SOLID CARBIDE
Single and Double-End. |

... There's a STANDARD End-Mill for every job requirement.



STANDARD'S

Authorized Distributors
Stock-ready for immediate
delivery—the COMPLETE
FAMILY OF STANDARD
QUALITY CUTTING TOOLS,
Twist Drills... Reamers... Taps...
Dies... Milling Cutters... End Mills
... Counterbores... Hobs... Carbide
Tools and Gages.

Take advantage of STANDARD'S
experience and know-how in metal-
lurgy and engineering for your
metal cutting problems.

Call the STANDARD Distributor
in your area.

STANDARD TOOL CO.



3950 CHESTER AVENUE CLEVELAND 14, OHIO

BRANCH WAREHOUSES IN. NEW YORK · DETROIT · CHICAGO · DALLAS · LOS ANGELES · SAN FRANCISCO

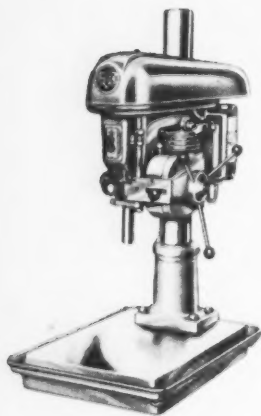
For more data circle 359 on Postpaid Card

You can do more with

DELTA



NEW: "Big" drilling jobs made easy



Delta 20" Drill Press, also 17", 15", 14" and 14" Super-Hi Sensitive. Available in floor, bench and multiple spindle models.

This custom "radial drill" is provided by combining standard Delta drill press components—a ball bearing traveling carriage, column, raising mechanism and choice of four Delta 20" drill heads. Mounted on an overhead track, it handles jobs too big for conventional drilling—in production runs too small to justify expensive, special tooling.

But in standard or special set-ups, Delta drill presses offer money-saving versatility and precision performance—they cost less to buy, operate, and maintain.

See the world's most *complete* drill press line—visit your Delta Industrial Distributor (listed under "TOOLS" or "MACHINERY" in the Yellow Pages). For FREE catalog showing 61 machines, 302 models, over 1400 accessories, write: Rockwell Manufacturing Company, Delta Power Tool Div., 606-DD N. Lexington Ave., Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Co. of Canada, Ltd., Guelph, Ontario.

Visit Delta in Booth No. 2046 at the A.S.T.E. Show

DELTA INDUSTRIAL TOOLS

another fine product by

ROCKWELL



For more data circle 360 on Postpaid Card

LOOK TO AMERICAN TOOLMAKERS FOR THE FINEST CUTTING TOOLS



Today's high speed steel tools for milling, sawing, tapping, drilling, broaching, reaming and other metal cutting operations are better than ever. Through research and development, and new and better production methods, American toolmakers are constantly improving high speed steel tools to help you make better products . . . at less cost.

As a leading producer of high speed and other specialty steels, Universal-Cyclops continues to aid your toolmaker's efforts with its own aggressive research and development program.



Look to your American toolmaker
for the finest in
high speed steel cutting tools!

CUTTING TOOLS made from HIGH SPEED STEELS

*are
Better Than Ever*

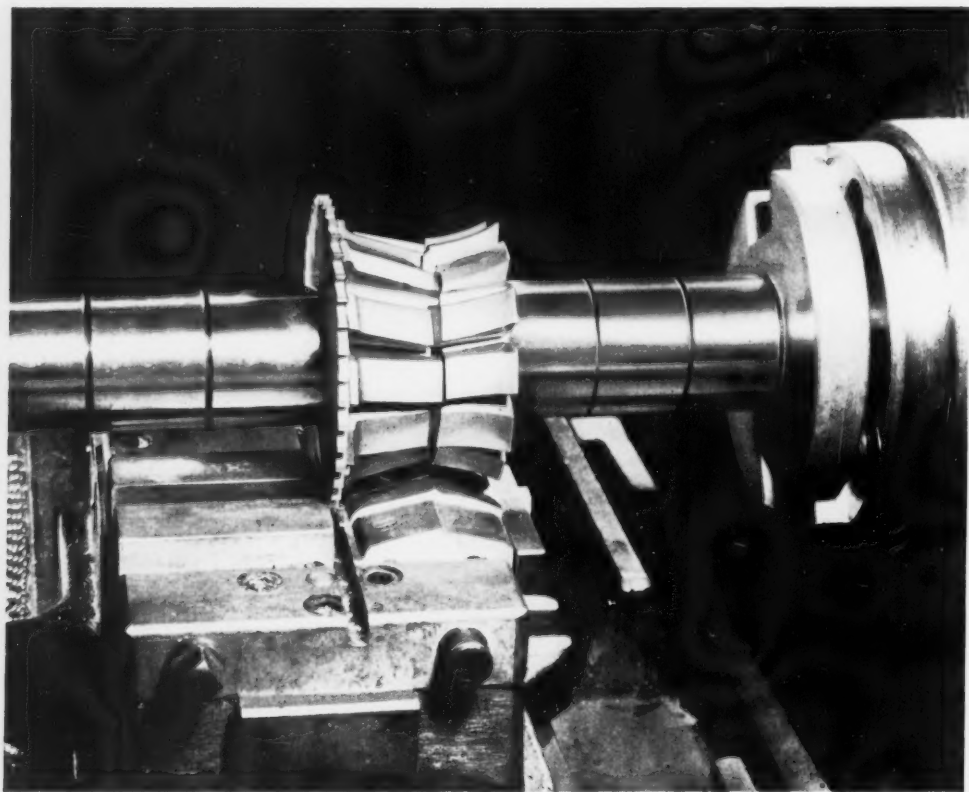
**UNIVERSAL
CYCLOPS**
STEEL CORPORATION
BRIDGEVILLE, PA.

TOOL STEELS • STAINLESS STEELS • HIGH TEMPERATURE METALS

For more data circle 361 on Postpaid Card

Mill Odd Shapes in One Operation

...with Barber-Colman Form-Relieved Cutters



Milling is the best way to produce accurate, irregular forms with a minimum of tooling expense. But, when you get down to cases, much depends on the design and quality of the milling cutter used.

Barber-Colman Company will manufacture a cutter from your part or print for almost any form. In it will be designed all the factors needed to upgrade production efficiency and work quality.

Take this small part, for example. As shown on the drawing, there are two opposed surfaces that require machining at right angles to the cutter axis. For efficient milling at these points, the teeth must have both left-hand and right-hand axial relief. This design problem was solved by making the tool interlocking, with axial relief in both directions. Right-hand and left-hand helical flutes assure smooth cutting action and fine finish.

The cutters are *unground*. Yet, all dimensions are held to a maximum tolerance of $\pm .002$ in. Angular surfaces are held to ± 30 minutes. A separate cutoff operation was eliminated by ganging a metal-slitting saw with the form cutters.

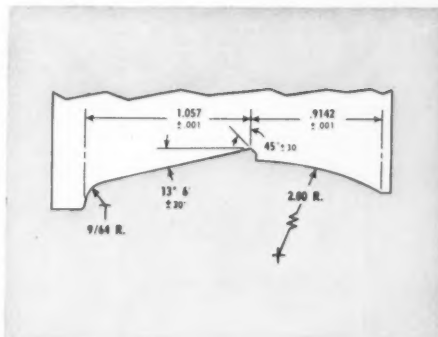
Thus, fine finish and high accuracy were provided at the lowest possible cost and with a minimum tooling expense.

Five types of engineering . . .

These Barber-Colman engineering and manufacturing capabilities can be added to your own in finding better solutions to milling problems:

1. *Application engineering* — on-the-spot evaluation of milling problems by experienced tool designers.
2. *Design engineering* — highly specialized tool engineering, backed by electronic computers for fast, accurate calculation of complex tooth forms.
3. *Metallurgical engineering* — specially selected steels and heat treatment for your particular material and tool geometry.
4. *Manufacturing* — the most complete and advanced processes under one roof for producing exactly the right finish, highest accuracy, and any cutter style.
5. *Quality control* — optical master inspection, seven different control stations, and numerous separate inspections for individual cutters.

If you are producing irregular parts by shaping, crush grinding, or milling, it will pay you to let a Barber-Colman milling cutter engineer look at the job. He will show you how to combine the maximum number of operations in a single cut with lowest possible tool cost. Call your Barber-Colman sales office or Rockford — TR-7-5741.



Barber-Colman Company



44 Loomis Street, Rockford, Illinois

For more data circle 362 on Postpaid Card

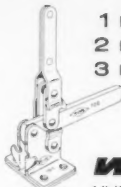


There's a **WESPO** clamp or plier for every clamping job!



80 models and sizes...

*made better three ways to
give more positive holding,
last longer!*



- 1 Reamed holes
- 2 Hardened serrated bushings
- 3 High tensile strength rivets

send for free catalogs describing Wespo clamps and fixture details

WESPO DIVISION
VLIER ENGINEERING CORPORATION
Formerly West Point Manufacturing Company
26935 W. Seven Mile Road • Detroit 19, Michigan

For more data circle 363 on Postpaid Card

**GET TRUE READINGS
ON FINISHES
EVERYTIME, EVERYWHERE
WITH
SURFINDICATOR**

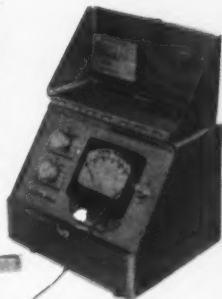
Job to job, plant to plant, *every* Brush Surfindicator gives true and identical readings from 0 to 1000 microinches on the same surface. Precision reference standard comes with every unit; makes field calibration simple and eliminates need for factory adjustment. The Surfindicator is immune to magnetic fields, vibration, line voltage variations; weighs but 15 pounds and is completely self-contained. **ONLY Brush Surfindicator Complies Completely With ASA and MIL Specs. See For Yourself. Request A Demonstration.**

brush INSTRUMENTS

37TH AND PERKINS

division of
CLEVITE
CORPORATION

CLEVELAND 14, OHIO



For more data circle 364 on Postpaid Card

The Answer... TO INDUSTRY'S DEMAND
FOR QUALITY, EFFICIENCY
AND LOW COST ECONOMY
**UNITED STATES ELECTRICAL
GRINDERS-BUFFERS**



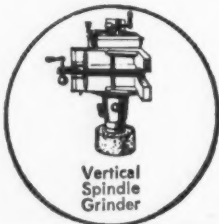
**A TYPE
FOR
EVERY
INDUSTRY**

An investment in better, faster production through the use of tools expertly designed and conscientiously crafted for your particular purpose.

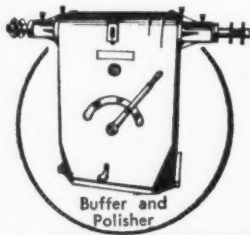
Every grinder, buffer, drill or any other U. S. Electrical Tool is precision-engineered for maximum endurance under exacting conditions. All are electrically and mechanically correct. Rotating parts and spindles are precision-balanced dynamically by electronic equipment.



General Purpose
Grinder



Vertical
Spindle
Grinder



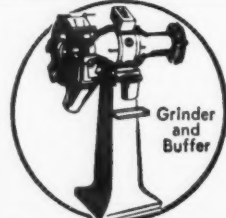
Buffer and
Polisher



Precision Lathe
Grinder



Tool Post
Grinder



Grinder
and
Buffer

"OVER 60 YEARS SERVICE TO INDUSTRY"

WRITE FOR CATALOGS

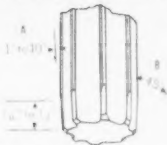
The United States Electrical Tool Co.
3640 LLEWELLYN ST., CINCINNATI 23, OHIO

For more data circle 365 on Postpaid Card

CLIP AND FILE

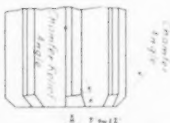
REAMING TIPS YOU CAN USE

SECONDARY CHAMFER



Grinding a secondary chamfer angle as illustrated (A) is often recommended. It is useful in applications where a fine finish or close tolerance is required. (B) is the regular chamfer.

KEEP IT SHARP



A chucking reamer is an end cutting tool. The cutting edges are produced by the chamfers at the ends of the lands. (A) To obtain maximum performance, the chamfers and clearance relief should be reground before excessive wear develops. Each chamfer should be ground exactly even or the tool may cut oversize.

OVERCOMING CHATTER

To end chatter in reaming, try Chicago-Latrobe's Duo-Spiral Reamer. The alternate left and right hand helixes tend to dampen cutting vibration; eliminate hogging; produce more accurate, better finished holes.

GOT A PROBLEM?

Arrange a consultation with a Chicago-Latrobe Sales or Service Engineer. His experience in hundreds of plants can lead to a quick solution of your problem.

Best tip of all...

ASK YOUR
DISTRIBUTOR
FOR ...



Chicago- Latrobe REAMERS

DRILLS • REAMERS • END MILLS
COUNTERSINKS • COUNTERBORES
CARBIDE TOOLS • SPECIAL TOOLS and
"LO-TORK" CHIP BREAKER DRILLS



Write Chicago-Latrobe or call your distributor

for CATALOG No. 59. Sixty-eight pages of illustrated

listings and specifications—including prices

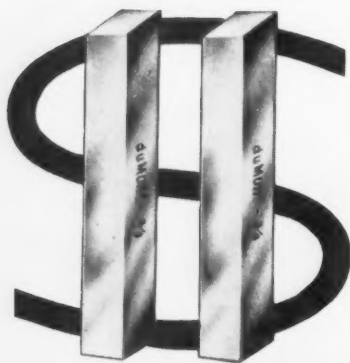
CHICAGO-LATROBE

411 West Ontario Street

Chicago 10, Illinois

For more data circle 366 on Postpaid Card

du MONT *balanced* TOOL BITS



SAVE YOU MONEY

An almost perfect balance of *toughness, wear resistance and heat resistance* gives duMONT Tool Bits a definite edge in cutting life, gives you more cuts per bit, more cuts per dollar.

See Us at Booth 647

A. S. T. E. SHOW

DETROIT, APRIL 21-28

The duMONT CORPORATION,
Greenfield, Mass.

MAIL FREE Tool Bit COMPARISON CHART, CATALOG and PRICE LIST S to

Name

Company

Address

For more data circle 367 on Postpaid Card

Meetings

Important Meeting

Dates

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

APRIL 3-8 • Nuclear Congress and Atomic Exposition, Coliseum, New York. Coordinator: Engineers Joint Council, 29 W. 39th St., New York 18, New York.

APRIL 4-7 • American Management Association, Packaging Show and Conference, Convention Hall and Shelburne Hotel, Atlantic City, N. J. Association headquarters: 1515 Broadway, New York 36, New York.

APRIL 18-20 • American Machine Tool Distributors Association, Semi-Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Association headquarters: 1900 Arch St., Philadelphia 3, Pennsylvania.

APRIL 19-21 • American Society of Lubrication Engineers, Annual Meeting and Exhibit, Netherland-Hilton Hotel, Cincinnati. Society headquarters: 5 N. Wabash Ave., Chicago 2, Illinois.

APRIL 21-28 • American Society of Tool and Manufacturing Engineers, Tool Show and Annual Meeting, Detroit Artillery Armory and Statler-Hilton and Sheraton-Cadillac Hotels, Detroit. Society headquarters: 10700 Puritan Ave., Detroit 38, Michigan.

APRIL 24-27 • Metal Powder Industries Federation, Annual Meeting and Powder Metallurgy Show, Drake Hotel, Chicago. Federation headquarters: 60 E. 42nd St., New York 17, New York.

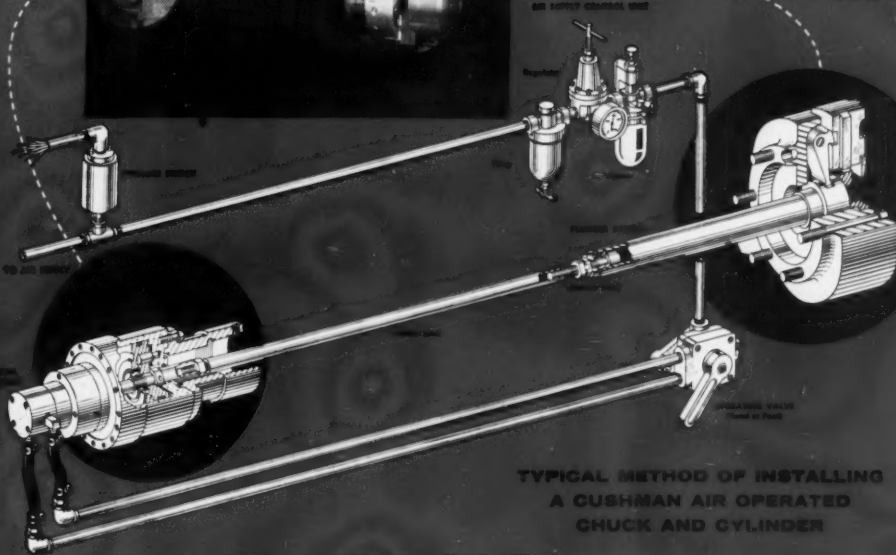
APRIL 25-29 • American Welding Society, Annual Meeting and Welding Exhibition, Biltmore Hotel and Great Western Exhibit Center, Los Angeles. Society headquarters: 33 W. 39th St., New York 18, New York.

APRIL 26-29 • Copper and Brass Research Association, Annual Meeting, Emerald Beach Hotel, Nassau, Bahamas. Association headquarters: 1900 Arch St., Philadelphia 3, Pennsylvania.

SEPTEMBER 6-16 • National Machine Tool Builders' Association, Machine Tool Exposition, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, New York.

CUSHMAN

DETROIT
APRIL 21-23
VISIT OUR BOOTH
* '60
ASTE TOOL SHOW
BOOTH 1021



Write today for Bulletin No. PO-66D and see for yourself how you can increase production and reduce machining costs on both new and old equipment at a surprisingly low investment.

MANUFACTURERS OF CUSHMAN POWER WRENCHES, MANUALLY OPERATED CHUCKS AND FACE PLATE JAWS

In
CASE
after
CASE
after
CASE
after
CASE

An automobile manufacturer in Michigan used Norton natural diamond wheels with resinoid bond, size $3\frac{3}{4} \times 1\frac{1}{2} \times 1\frac{1}{4}$, type D11V9 for dry sharpening carbide tipped broaches. Compared to a competitive diamond wheel of similar specifications, the Norton wheel removed stock at a cost of \$25.36 per cubic inch of carbide. Stock removal costs for the competitive wheel were \$34.50 per cubic inch. The Norton wheel reduced grinding costs 26.5%.

A mid-western manufacturer of small gasoline motors used a Norton resinoid wheel having man-made diamond abrasive, size $6 \times 3\frac{3}{4} \times 1\frac{1}{4}$, type D6A2C to wet-grind single point carbide tools. These Norton wheels, compared to another brand of similar type and description, provided twice the life of the competitive product.

A mid-western manufacturer of machine tools ran Norton resinoid wheels, of mined diamond, size $6 \times 1\frac{1}{2} \times \frac{5}{8}$ type D6A9 against a competitive wheel of comparable type and description for the dry grinding of carbide milling cutters. The Norton wheel lasted 521 hours compared to 300 hours for the other wheel. The Norton wheel provided 73.6% more usable life.

A western producer of aluminum used Norton resinoid-bonded diamond wheels of man-made abrasive to dry-grind carbide milling cutters. Wheel size was $5 \times 1\frac{3}{4} \times 1\frac{1}{4}$, Norton type, D11V9. Previously, the customer had been using a competitive wheel of similar specifications. The Norton wheel, compared to the other brand, cut faster and had twice the useful life.

Norton Diamond Wheels — Mined or Man-made — out-grind them all



Norton was first to introduce all three kinds of diamond wheel bonds: resinoid, metal and vitrified . . . does all its own checking and sizing of diamonds . . . duplicates wheel specifications with constant accuracy.

Resinoid bonded diamond wheels are best for such jobs as precision grinding of cutters, form tools and die blanks. They are available in several bond types — B type for wet grinding — B6 type for dry grinding.

Vitrified bonded diamond wheels are used for sharpening single-point cutting tools, grinding chip grinders and for surfacing carbide dies.

Metal bonded diamond wheels are sometimes preferred for grinding chip breakers, for certain offhand grinding jobs and for cutting off sintered carbide blanks, etc.

Norton leadership in diamond wheel manufacture continues whether the diamonds used are natural or man-made.

As the world's largest producers of abrasives, Norton maintains the most modern equipment designed for product quality control. Expert engineering assistance and prompt deliveries are also geared to provide the wheels you need for top quality, lowest cost carbide grinding. For these helpful services, see your Norton Abrasive Engineer or Norton distributor. Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

W-1976

NORTON
A B R A S I V E S



75 years of . . . Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Electro-Chemicals

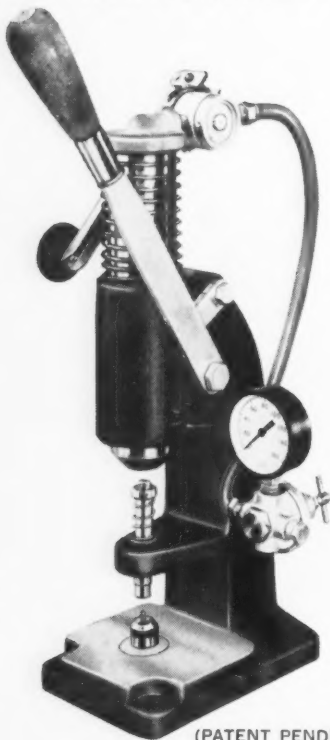
BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

For more data circle 369 on Postpaid Card

NOW 2 BIG JOBS ON 1 MACHINE

*... without
tool change*

THE NEW CRAMER PRESSTAKER



(PATENT PENDING)

Press-fitting and final staking of assemblies are *both* done by this radically new production tool . . . at rates impossible with separate machines, with much greater precision than obtainable up to now, and without parts breakage.

- Sub-assembly inventories can be reduced or entirely eliminated, because of far faster production from primary components.
- Standard tooling, completely interchangeable, meets the needs of an enormous range of jobs.
- Set-up time for combined operations is less than 20 seconds, and the operator herself can easily do it.
- Brittle phenolics do not break in staking, because the staking blow is exactly controlled and the stake is properly shaped.
- Accuracy of both hold-down and staking punch is held within 1/1000, by precision machining and unitized construction.
- Staking blow is pure impact . . . air powered, uniform, and without recoil.
- Operator safety is complete: one hand is on the hold-down lever, the other on the staker release.
- Deep-throat model takes printed circuit boards 20 inches wide.

**WRITE TODAY FOR BULLETIN
TELLING HOW IT'S DONE**

Find out how *you* can do jobs you never thought possible . . . swap assembly problems for profits . . . and give your production line a new boost in output and morale.

MACHINE TOOL DIVISION

**CRAMER CONTROLS
CORPORATION**

CENTERBROOK, CONNECTICUT

A few distributorships are still available in choice locations. If interested, write to us immediately.

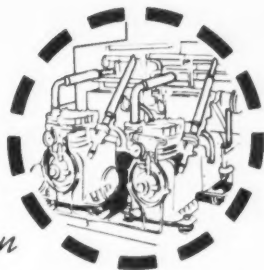
For more data circle 370 on Postpaid Card

CINCINNATI SUB-ZERO CHAMBERS have the

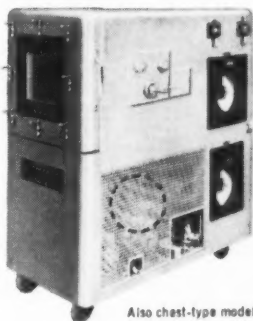
FINEST REFRIGERATION SYSTEMS

Compact, so units occupy minimum floor space . . . meeting the special needs of your industry with

Custom Engineered Design



- Hermetically sealed compressors
- Overload and under-voltage protection
- Pressure and electrical safety controls
- Refrigerants and refrigeration systems in accordance with nationally approved standards of design
- Air or water cooled systems
- Loss of refrigerants minimized by pressure equalization



Also chest-type models
for production chilling

Visit our Booth 409, ASTE Tool Show, Detroit, April 21-28



CINCINNATI SUB-ZERO PRODUCTS

General Offices & Plant
3930-S Reading Rd. • Cincinnati 29, Ohio

Representatives in major industrial areas
Member: Environmental Equipment Institute

For more data circle 371 on Postpaid Card

ON YOUR PRODUCTION LINE

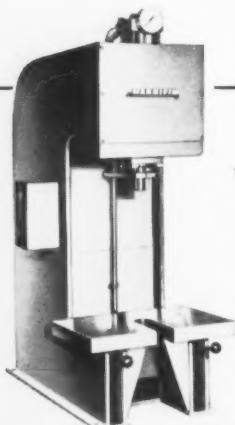
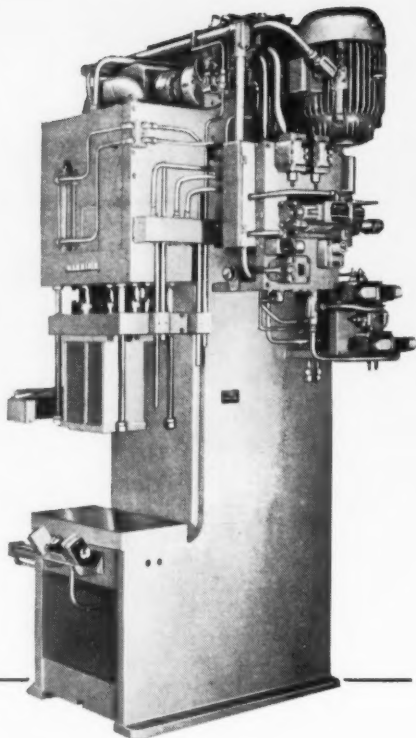
Get pressure
where you need it
with a

HANNIFIN FORCING PRESS

150 TONS to 1 TON

•
GAP OR COLUMN TYPES

•
HIGH SPEEDS • LOW PRICES



WITH THESE FEATURES:

1. All-steel welded frames—normalized.
2. Steel-head, heavy-duty cylinders.
3. Induction case-hardened rams.
4. Wide choice of ram speeds.
5. Built-in power units.
6. Wide choice of controls.
7. Special loading and unloading mechanisms where needed.

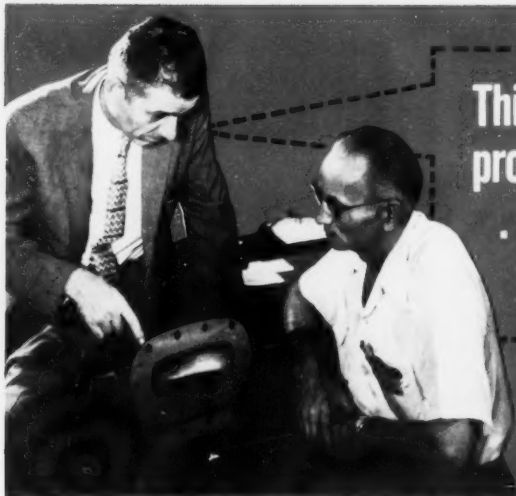
Call in your nearby Hannifin man—he's a trained production analyst—find out how you can do more at lower costs with Hannifin presses. Or, write for our new Bulletin 130-G. It tells the whole story.

HANNIFIN COMPANY

565 South Wolf Road • Des Plaines, Illinois

— A DIVISION OF PARKER-HANNIFIN CORPORATION —

For more data circle 372 on Postpaid Card



This was our biggest production bottleneck ...until we got Spiral Points*

says Jack Anderson,
Chief Industrial Engineer at
Lunkenheimer Company,
Cincinnati valve manufacturer.

"Just two of these holes are critical—all other machining operations are located from them. But it used to cost us plenty to get them right—frequent drill sharpening, slower feeds, touching up the holes, even special locating pins and eccentric guide bushings.

"It sounds like a miracle, but our spiral point drills broke this production bottleneck completely! They maintained consistent hole size, well within our plus .005" minus .004" tolerance. They don't walk, so guide bushing wear has been practically eliminated. And, where

we used to get 225 to 250 parts per drill grind, we now average 2000 or better.

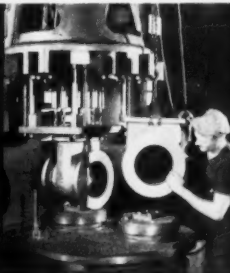
"In short, they drill holes where we want them, to the size we want them... in one pass. Now production stays on schedule... scrap is negligible."

**Spiral point is Cincinnati's new drill point geometry which transforms a standard twist drill into a cost-reducing, precision tool. Cincinnati's SPIROPOINT® DRILL SHARPENER automatically applies this new point geometry in a matter of seconds.*

ASK YOUR CINCINNATI LATHE AND TOOL CO. DEALER, OR WRITE TO US DIRECT.

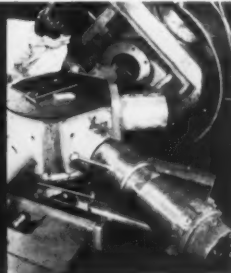
SPIRAL POINTS HERE...

Drilling mounting holes in the flange of a cast iron gate valve. The self-centering action of spiral point geometry maintains hole-positioning accuracy without excessive wear on guide bushings—produces round, on-size holes.



MEANS ACCURACY HERE (at lower cost)

Machining and threading seat ring groove in gate valve body. All internal machining is performed with the valve body held in work fixtures which accurately locate from two spiral point drilled holes.



Improved Machining Through Research
CINCINNATI LATHE AND TOOL CO.
3207 Disney Street • Cincinnati 9, Ohio

"TRAY-TOP" Lathes / "CINCINNATI" Drilling Machines / "SPIROPOINT" Drill Sharpeners

For more data circle 373 on Postpaid Card

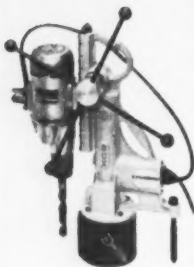


BUX
2242

NEW!

BUX RADIAL POSITIONER

Accurate Drill Positioning — FAST!



New, positive mechanical-action Bux radial positioner assures faster, accurate alignment of Bux portable magnetic drill presses. Magnetic base remains stationary, safely holding unit to work on any overhead or vertical flat working surface. Full 330° positioning rotation. Lateral movement provided assures precision positioning for drilling, reaming, tapping. Available on Bux magnetic drill press models L-2RP and L-3RP.



Cap. 3000 + lbs

LIFTING MAGNET



by
BUX

FEATURES:

- Absolutely Permanent Ceramic Magnets
- Lifts better than 3000 lbs
- 6½" x 13" lifting face
- Needs no wires (electric)
- Never needs "recharging"
- Magnet cannot be turned off when in use.
- No wet batteries or acid

BUX
magnetic products

A Subsidiary of O. S. Walker Co.

BUCK MFG. CO.
P.O. Box 692
1355 North 10th St.
San Jose, Cal.



Walker
2242

AT THE
SHOW-

NEW!



CERAMAX ROTARY CHUCK

**with Ceramic Magnets
for Turning and Grinding**

New Ceramax Rotary chucks with permanent ceramic magnets are powerful enough for safe rugged lathe work as well as grinding. All steel top plate construction. Variable holding for easy work positioning. Simplified spindle mounting has no collector rings or brush units. In the locked ON position, chuck will *not* demagnetize. Rotationally balanced whether in "ON" or "FREE" position. Available in sizes from 4" to 12" diameters.

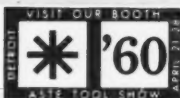


O.S. Walker

O. S. WALKER CO. INC., WORCESTER, MASS.
Original Designers & Builders of Magnetic Chucks



Walker
2242



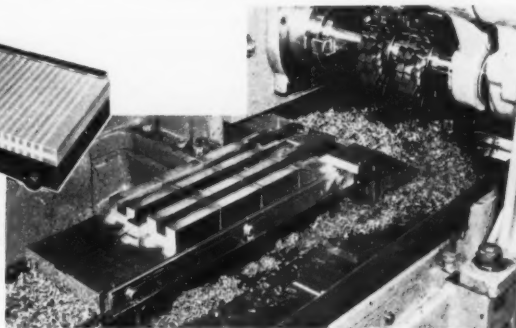
Walker
2242



Walker **CERAMAX RECTANGULAR CHUCKS**

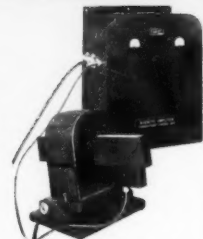
Check these advantages
of Ceramax Chucks —

- Holding power extends to periphery of chuck.
- Silver brazed all-steel top plate.
- No magnetism imparted to work; chips and grit fall freely from work surface.
- No soft gap strips in which chips become imbedded — eliminates constant redressing.
- Three times coercive force of ordinary Alnico magnets.
- 1/4" pole spacing.
- Low in height for greater machine capacity.
- Sizes from 4" x 4" to 12" x 24".



NO MATTER HOW COMPLEX YOUR PROBLEM

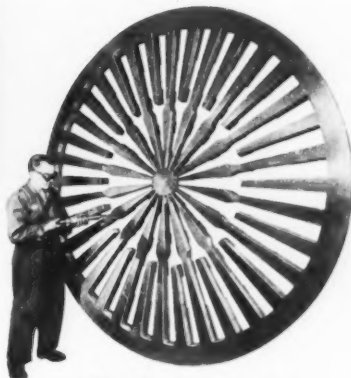
Walker has the know-how to solve it!



Here are three typical instances of how O. S. Walker, can solve unusual problems for customers.

Above — A large three faced electro magnetic chuck measuring 13 1/2" x 22" x 158" especially built for the knife grinding industry.

At right — A 96" diameter rotary auxiliary plate being prepared for production.



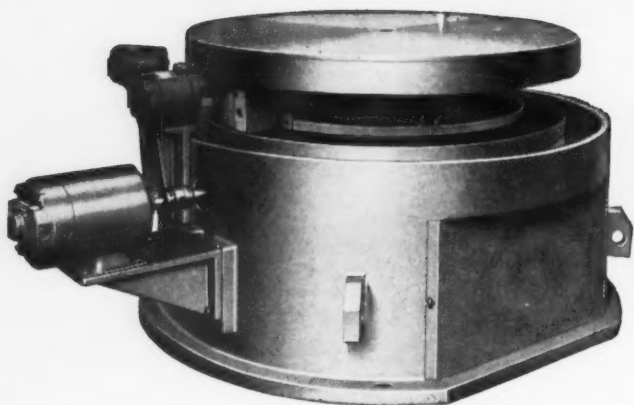
O.S. Walker

O. S. WALKER CO. INC., WORCESTER, MASS.

Original Designers & Builders of Magnetic Chucks

Above — An example of Walker engineered demagnetization — a special Saturable Reactor Control Demagnetizer for ball bearings.

For more data circle 374 on Postpaid Card



drill varied hole patterns without changing set-up

If your drilling, tapping, or milling jobs require even, uneven, or skip indexing, this new Electrodex table will give you more flexibility than ever.

Set up your work piece just once on this table, and you can drill many different hole patterns. Changeover from one index pattern to another is fast. You can do it mechanically—with index rings or inexpensive templates—

or by push-button electrical counting.

Eight-channel numerical tape control is available. You get indexing accuracy to $\pm .001$ " at a 45" diameter. And you can choose your table size from 30", 45", 60", and 80" diameters.

Bulletin 258 gives complete details.

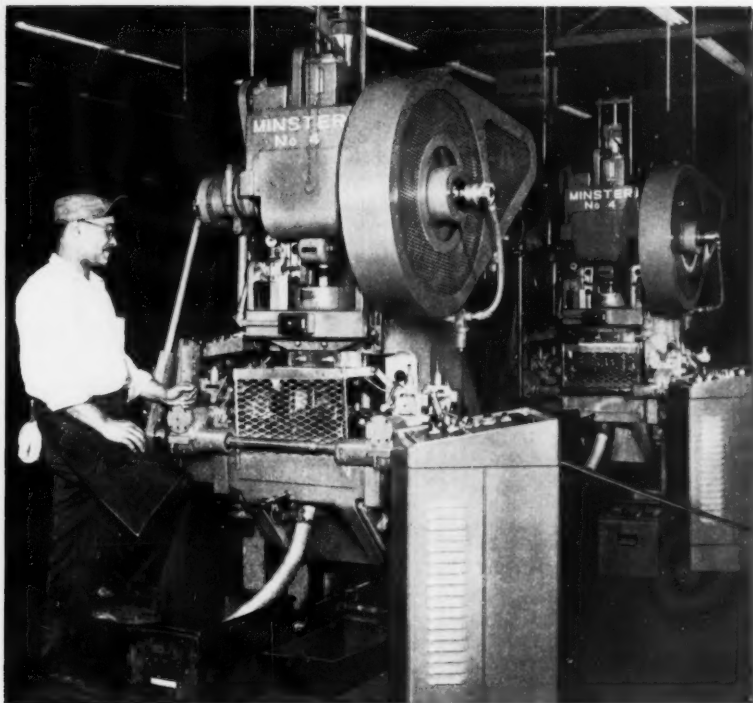
Avey Division, The Motch & Merryweather Machinery Co., Box No.1264, Cincinnati 1, Ohio.



For more data circle 375 on Postpaid Card

AUTOMATIC PRODUCTION

gives you maximum press efficiency, less handling



Minster O.B.I.'s ranging from 12 to 110 tons capacity give superior performance on automatic production because of close bearing clearances, heavy, rigid frames, precise gib fitting and fast controlled action of the Minster clutch and brake.

Photos courtesy of Automatic Electric Company, North Lake, Illinois.

Minster Feed Equipped O.B.I. Presses

Costs decline rapidly when stampings are produced automatically. Speeds are higher, parts more accurate, presses run at top efficiency.

Automatic production . . . long or short run . . . is *most* profitable when done on a Minster press because every Minster press has the inherent precision and stability needed for this type of work.

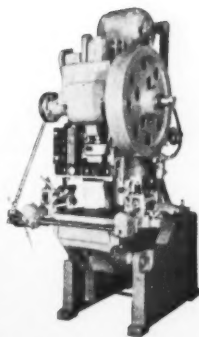
Minster can provide the right press equipped with job-matched feed to assure you of maximum productivity and savings.

Want to investigate the possibilities? Write or call us today.

The Minster Machine Company • Minster, Ohio

MINSTER®

For more data circle 376 on Postcard Card



split-second response!
more work per hour!



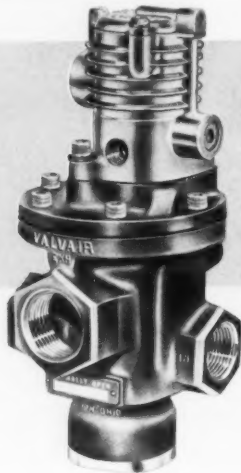
with **Valvair[®] HI-SPEED
 INLINE
 VALVES**

- solenoid coil guaranteed against burn-out for life of valve
- instant-action control • air-cushioned poppet
- multi-million cycle dependability • JIC pilot

Short poppet travel in Valvair's HI-SPEED INLINE provides maximum flow almost instantaneously. This shortens machine cycle time . . . lessens brake and clutch slip . . . provides more accurate cuts on high speed cut-offs . . . decreases set-up time . . . minimizes drift, for safer operation.

For increased production . . . lower costs . . . greater safety . . . specify Valvair HI-SPEED INLINE valves.

Write for free Bulletin HIN. Address: Valvair Corporation, Akron 9, Ohio, Dept. ~~MD-360~~ MMS-460.



HI-SPEED INLINE with integral pilot, 2- or 3-way, NO or NC, 3/8 to 1 1/4 in. NPT.

Valvair
 AKRON 11, OHIO
 A DIVISION OF THE SINCLEAR-COLLINS VALVE CO.
 Other INDUSTRIAL DIVISIONS OF IBEC: The Sinclear-Collins Valve Co.,
 The Bellows Co., Akron, Ohio • V. D. Anderson Co., Cleveland, Ohio.



8110

For more data circle 377 on Postpaid Card

STRIPPIT SUPER 30 FABRICATOR



Larger work sizes for more efficiency...for short run punching — 30" x any length
...for production run hole duplication — 25" x 30".

Adjustable table for greater accuracy and flexibility...for punching to closer tolerances in angles, shapes and formed parts as well as flat sheets.

New, no-jam electric head eliminates down time...and the need for pressurized air. Fewer parts minimize maintenance — ensure quieter, more positive operation.

Wide range of hole punching capacities...from a $3\frac{1}{2}$ " hole (round or shaped) in 16 gauge to a $\frac{1}{2}$ " hole in $\frac{1}{4}$ " mild steel.

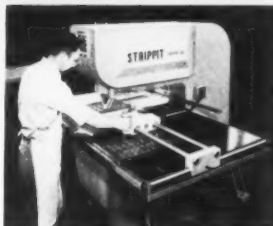
Corner and edge notching...up to 5" x 5" in 16 gauge mild steel — 90° corners, rectangular, vee, radii and special shape edge notches.

Straight line nibbling and contour shearing...at 165-strokes per minute in $\frac{1}{8}$ " mild steel. Instant changeover from single stroke punching.

New swing-shift punch holders...quick-opening, positive-closing — for right or left-hand operation. Electrical interlock for safety.

Exclusive quick-change tooling system...using standard stock punch and stripping guide assemblies and die buttons. Size changes take less than 20 seconds.

New quick-set gauging system...with micrometer settings for fast, accurate layout and rapid work positioning.



EASY CONVERSION TO A PRODUCTION PUNCHING UNIT...

with the Strippit Duplicator which can be built-in as an integral part of the Super 30 Fabricator — and the Dupl.O-Scope for punching Duplicator templates from a drawing, layout or sample part.

WRITE TODAY... for complete details, illustrated literature, price and delivery.



WALES

STRIPPIT INC.

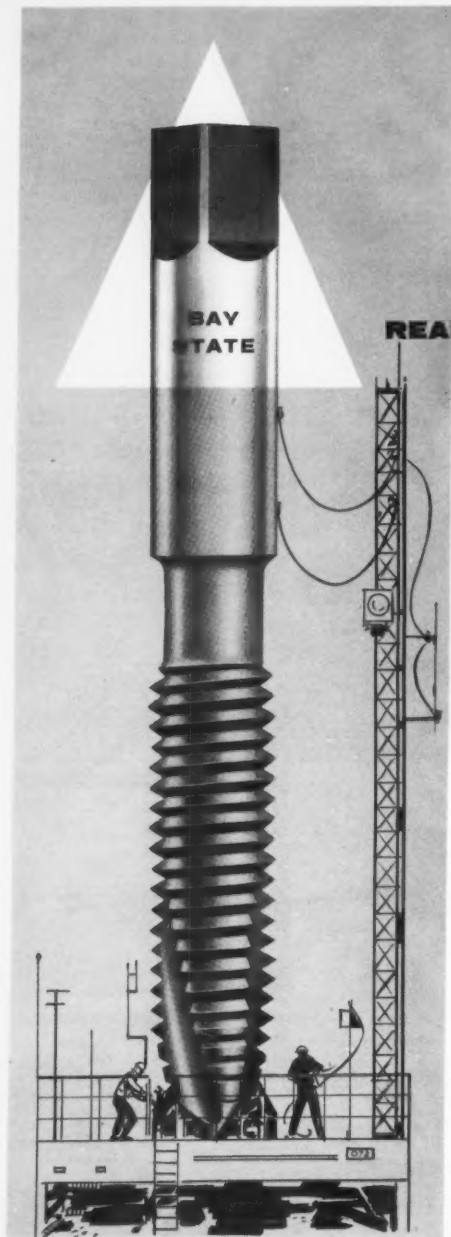
207 Buell Road, Akron, New York

In Canada: Strippit Tool & Machine Company, Brampton, Ont.

For more data circle 378 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 69



*A tap on the job is worth
two in the mail*

READY FOR IMMEDIATE DELIVERY...

A Precision Tapping Performance

Bay State Announces New Sales and Service Facilities

8 New Stockrooms — *strategically located and fully stocked* — provide your distributor with immediate delivery of precision performance Bay State taps.

"Rapid Wire" electronic system assures up-to-the-minute communication between all stockrooms and factory.

Expanded staff of Bay State application engineers — tapping specialists provide undivided attention to your tapping problems.

Specifying Bay State taps results in *Immediate Delivery Of Precision Performance* Tapping from the nearby shelves of your Bay State Distributor.



STOCKROOM AND FACTORY LOCATIONS

BAY STATE TAPS

Bay State Tap & Die Company • Mansfield, Massachusetts

For more data circle 379 on Postpaid Card

TAKE A CLOSE LOOK AT YOUR "HOLE COST" SITUATION



The costs of producing sheet metal parts vary greatly—but one fact stands out. Holes can be pierced in short run work at the lowest cost with a Wiedemann Turret Punch Press.

Wiedemann savings of 60% to 90% are commonplace throughout industry. These are possible because a Wiedemann combines:

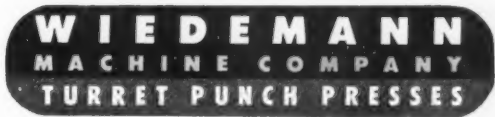
1. the speed of a punch press.
2. low cost punches and dies in turrets ready for use without setup.
3. a quick setting mechanical work positioning gauge.

Find out how a Wiedemann will reduce your "hole costs." Send drawings of your work for time study and write for Bulletin 201.



Machine Tool Exposition
Chicago Sept. 6-16

SEE WIEDEMANN PRESSES FROM
THE HAND OPERATED R-2 TO
THE TAPE-CONTROLLED WIEDEMATIC
IN OPERATION . . . BOOTH 1249

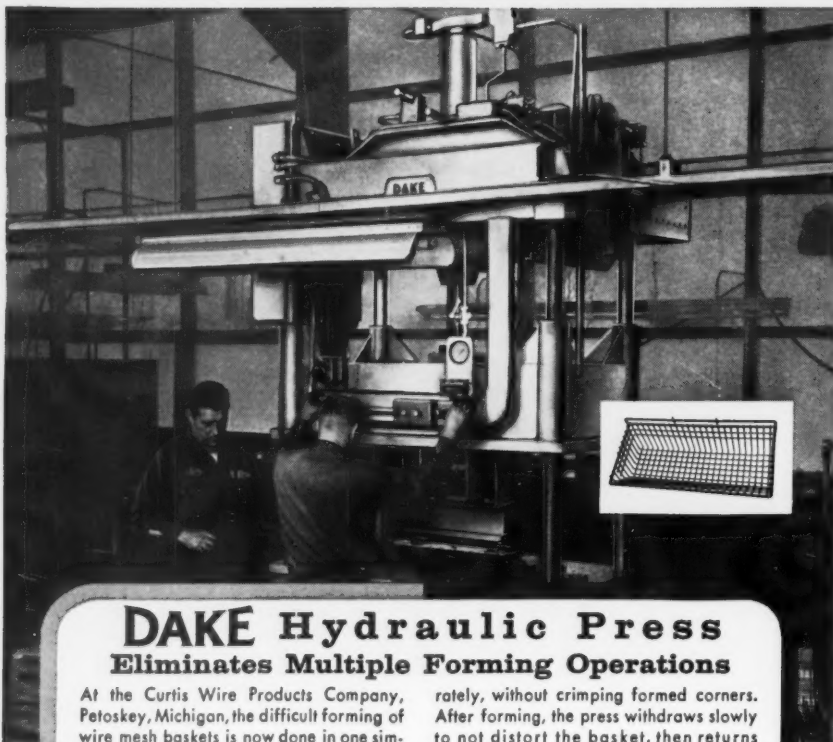


DEPT. MM-4 • GULPH ROAD • KING OF PRUSSIA, PA.

For more data circle 380 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 71



DAKE Hydraulic Press Eliminates Multiple Forming Operations

At the Curtis Wire Products Company, Petoskey, Michigan, the difficult forming of wire mesh baskets is now done in one simple operation with a Dake 50-ton Hydraulic Guided Platen Press. The Dake Press saves considerable production time per basket by eliminating previous operations which formed only one side at a time.

The preset cycle of the Dake Press eliminates any possibility of operator error. After the wire mesh is placed in the die, the operator presses dual palm buttons which close the press rapidly until just before the wire mesh is contacted. It then slows to an adjustable pressing speed and forms the material smoothly and accu-

ately, without crimping formed corners. After forming, the press withdraws slowly to not distort the basket, then returns rapidly to the top of its stroke.

Every feature of a Dake Press is designed to save production time. The press stroke may be set to eliminate unnecessary travel. Rapid advance and rapid return increase the pressing cycle. Large bed area with ample daylight provides easy insertion and removal of pressed parts.

Dake Presses are available in capacities from 25 to 600 tons. For special applications, investigate the Dake line of Custom-Engineered Presses. Write for Catalog.

DAKE CORPORATION 612 Robbins Road, Grand Haven, Mich.

**DAKE
PRESSES**



Arbor Presses



Hand-Operated Hydraulic



Power-Operated Hydraulic



Guided Platen

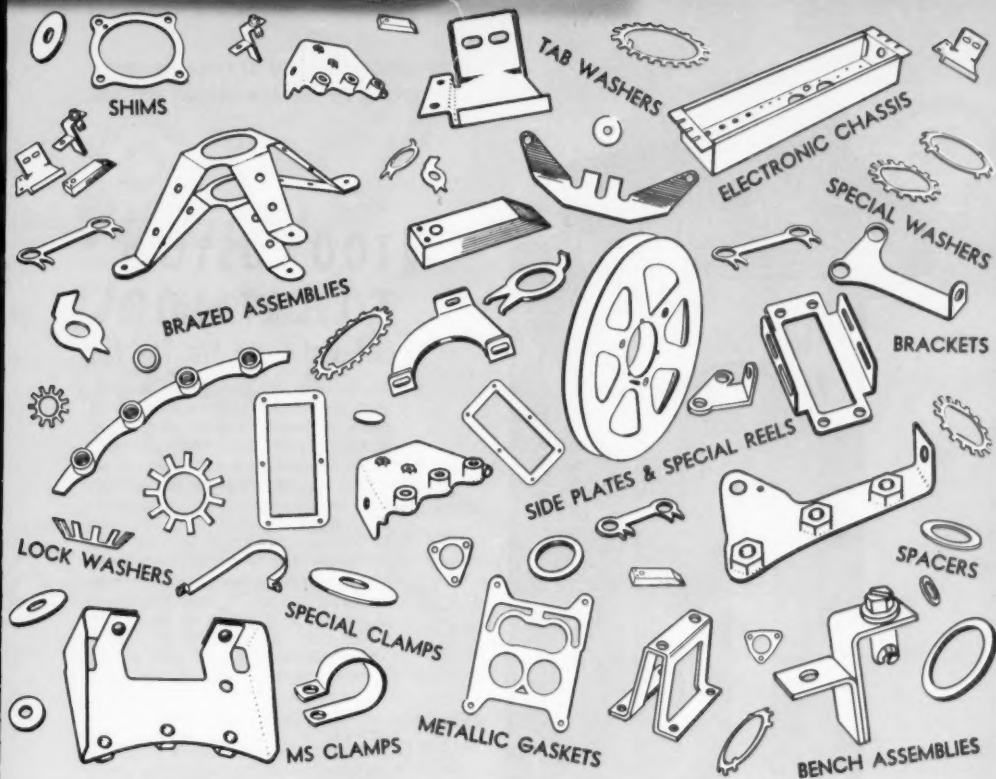


Gap Type Presses



Movable Frame

For more data circle 381 on Postpaid Card



You name it . . . we'll stamp it one or a million @ minimum cost

You'll get better service on Stampings from THE LAMINATED SHIM COMPANY. This is literally true because (a) we've been doing it since 1913, and (b) we've perfected our own special equipment, tooling and techniques—all unknown to

the ordinary stampings shop. Therefore you get exactly what you want, including the degree of precision you need—any contour, often without dies—any size—any quantity—fast, and at a surprisingly low cost—according to our

1

"ONE PLUS" METHOD

Applies when you need just a few pieces for prototypes or experiment. We hold all critical dimensions, yet avoid tooling charges.

2

SHORT RUN METHOD

More than "a few," but less than production quantities. Temporary tooling, simple dies and special presses keep costs down.

3

PRODUCTION RUN METHOD

Applies when quantity, tolerance, size and contour factors justify our standard production tooling and/or nominal die charges.

4

"WATCH DOG" SERVICE

A routine procedure. We re-evaluate repeat orders as to quantity and specs—then use the Method best for you.

Result: lowest possible cost per unit, regardless of quantity. Want more details? And suggestions for ordering Stampings economically? Send for STAMPINGS Folder No. 3—a most helpful reference booklet.



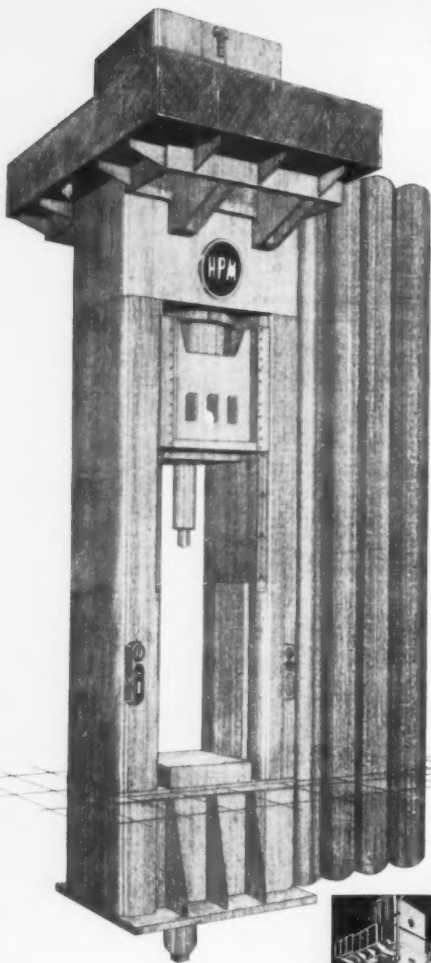
Stampings

DIVISION • THE LAMINATED SHIM COMPANY, INC.

3304 UNION STREET, GLENBROOK, CONNECTICUT

For more data circle 382 on Postpaid Card

HOW MODIFIED H-P-M STANDARDS TRIPLE
THE USEFULNESS OF METALWORKING PRESSES



TOO CUSTOM TO CATALOG

But Just Right For The Job

The sketch at left emanated from the proposal engineering department at H-P-M and a few months later the press, shown in the small photo below, became a reality. It was designed for a combination of hot forging and cold extrusion and incorporated enough unusual press requirements to qualify as special. This 1000-ton H-P-M has a bed area of 66" x 60", 98" of daylight and a 60" stroke. It is equipped with a 150-ton hydraulic ejector cylinder with a 24" stroke. The main ram travels at a speed of 1000 ipm for closing and return with a pressing speed of 600 ipm. The accumulator system shown at right supplies a high speed pressure stroke of 19" in length.

Completely special as normal requirements go but a pressure processing problem that's a typical standard for H-P-M engineers. Both the engineering ability and the facilities to manufacture such huge equipment make H-P-M your best source for metalworking machines of the future.

You're under no obligation to investigate the service that H-P-M has been performing for years — special hydraulic design for the metalworking industry. Write or call for complete details.



The design sketch illustrated is a perspective illustration that accompanies each H-P-M proposal for special machine recommendations. These portfolios contain complete job recommendations, layout drawings, press specifications, delivery and price. It's a service that is backed by thousands of engineering hours from our experienced staff of hydraulic specialists.

THE HYDRAULIC PRESS MANUFACTURING COMPANY

A Division of Koehring Company • Mount Gilead, Ohio, U.S.A.



H71

For more data circle 383 on Postpaid Card

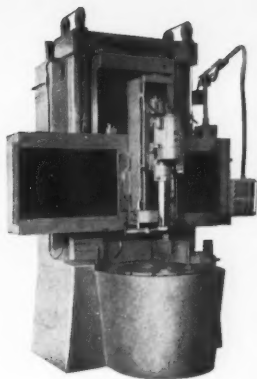
Vertical Universal Grinders

Springfield vertical universal grinders are among the most versatile tools you can use for *both* production and toolroom work. Head is easily positioned to grind ODs, IDs, surfaces, offsets and undercuts in *any* combination, generally with one chucking. Work may be regular or irregular in shape, up to 48" high with up to 52" swing on standard machines. Weight of workpiece is no problem because gravity works for you in vertical grinding — helps achieve extreme micro-inch finish and concentricity.

A typical example of a Springfield's remarkable precision is its ability to grind taper valve plugs and seats with one angle setting of the head—and get 95% blue or better on a taper gage with surface finish smoother than 30 RMS.

For high production, sometimes involving automatic loading, cycling, size control and unloading, Springfield builds special vertical grinding machines. Most of these can be reset when part changes occur. Another area in which Springfield has pioneered is in vertical contour grinding machines that handle missile parts.

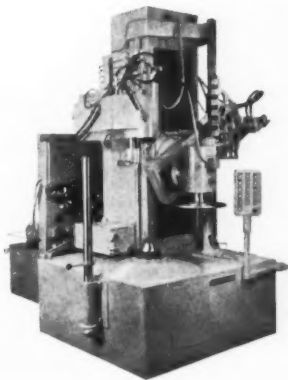
If you would like to know more about Springfield vertical grinders, please write for Bulletin 197-G.



model 3-TR
52" swing



new developments coming!



vertical
contour
grinder

SPRINGFIELD

*The Springfield Machine Tool Company
Springfield, Ohio*

For more data circle 384 on Postpaid Card

April, 1960

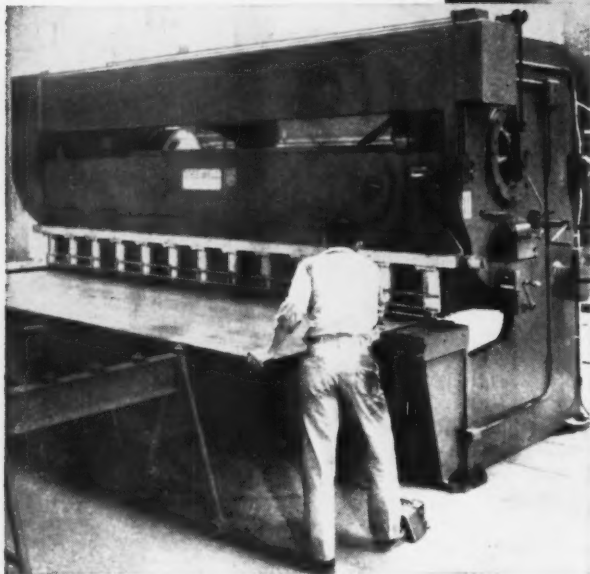
MODERN MACHINE SHOP 75

For The Best Cut, The KNIFE CLEARANCE Must Be Used

Steelweld Shears are available for all thicknesses of steel to 2 inches and for lengths to 30 feet. Electric foot-switch operation, as illustrated, is furnished as standard equipment



In 10 seconds the knife clearance on Steelweld Shears can be adjusted to suit the thickness of metal being cut. It's merely a matter of turning a hand crank until the gauge pointer is on the proper figure.



**Table of
Recommended
Knife Clearances**

Gauge	Steel	Stainless
10	.012	.007
8	.014	.009
3/16	.016	.010
1/4	.021	.014
5/16	.027	.018
3/8	.032	.022
1/2	.043	.029
5/8	.053	
3/4	.064	
7/8	.075	
1	.086	

FOR every plate thickness there is a definite space or clearance between the knives that will produce the best result. When cutting different thicknesses of metal, it is necessary to vary the knife clearance accordingly.

One of the important differences between Steelweld Pivoted-Blade Shears and all others is the ease with which the knife clearance can be adjusted on Steelwelds. With most shears this is a major operation involving the use of measuring devices and requiring a great deal of time. Steelwelds were designed to make this adjustment simple, easy and fast. Hours of work are not required, in fact, the adjustment for any plate thickness can be made in 10 seconds.

Obviously there is no need to shear with some compromise knife clearance setting when you have a Steelweld Shear. You do not have to

accept any average cut when with such little effort you can have the best possible cut every time—sharp, straight, accurate with minimum burr. And then, too, remember that knives stay sharp longer when the proper clearance is used.

Easy knife adjustment is only one of many fine features that you will like in Steelweld Shears. For all thicknesses of plate up to 2 inches, for all lengths to 30 feet, you will find Steelwelds have much to offer.

Write for free copy of Catalog No. 2011.

Gives construction and engineering details

STEELWELD



SHEARS

STEELWELD DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 6455 East 282 St. Wickliffe, Ohio

For more data circle 385 on Postpaid Card



Everyone
who uses small presses
can **PROFITABLY** use

HYDROLAIR

Elmes HYDROLAIR® is specially designed to meet ALL small-press needs in metal-working and plastics—on job shop or production work.

A full oil-hydraulic press without motors or pumps, HYDROLAIR *operates directly from your shop air line.*

ECONOMICAL . . .

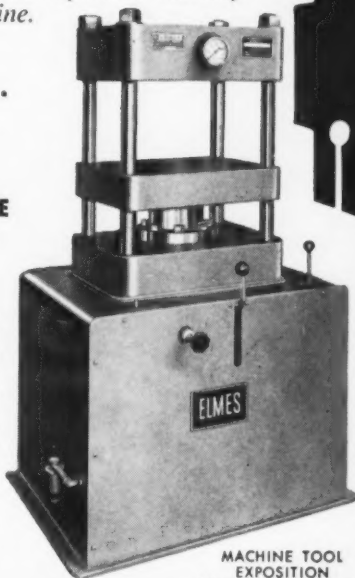
COMPACT . . .

VERSATILE . . .

**EASY TO OPERATE
and MAINTAIN**

Elmes 50-ton HYDROLAIR—30, 50, 75 and 100-ton models with hand lever control; 50-ton model also available with electrical control. All models adaptable for optional standard modifications.

*Get ALL the facts—
write for Catalog 1036-C.*



MACHINE TOOL
EXPOSITION
CHICAGO, Sept. 6-16

American Steel Foundries/ELMES-KING Division
1170 Tennessee Avenue, Cincinnati 29, Ohio

ELMES Hydraulic Presses and Equipment

KING Vertical Boring and Turning Machines



For more data circle 386 on Postpaid Card

**WE MAKE SURE
PIPE MACHINERY
GAGE MATERIALS GET
THE BEST TREATMENT**

At Pipe Machinery, years of experience has taught us the best treatment for each of our gage materials. Leaving nothing to chance, we maintain our own heat treating department where this special "know-how" can be properly exploited. The High Speed Steel used for all plug gages through one and one-half inches as well as other gage metals are carefully heat treated under the most rigid quality controls — to assure accuracy and long wear life for the finished product.

Are you certain you're getting the best material and heat treatment in your gages? If they're from Pipe Machinery, the answer is an emphatic yes!

For further information on our complete line of quality gages, write us on your letterhead today.

THE PIPE MACHINERY COMPANY • 29100 Lakeland Boulevard • Wickliffe, Ohio • Greater Cleveland

For more data circle 387 on Postpaid Card

HOUR OF DECISION



IS THIS YOU? How many times, after the call bell stops clanging, the customers stop phoning, and people stop asking questions, do you walk into the quiet shop to face up to the really vital decisions?

"How can we compensate for the rising costs of materials, overhead, payroll, maintenance?" "How can we keep producing the exacting tolerances, finishes, and quality our markets are demanding?" "How can we improve our production efficiency so that our narrow profit margin will not disappear altogether?" "How can we meet and beat the increasing world-wide competition in our field?"

One proved answer to these questions is the logical replacement of obsolete, inefficient machines. **THE MACHINE TOOL EXPOSITION — 1960** will back

up this fact with 11 acres of the latest developments in machine tools. Can you afford to miss seeing new, faster machine tools that will produce more efficiently . . . new, better methods that will cut satisfying chunks out of metalworking costs . . . new, ingenious ideas that will help you produce more quality for less cost?

Tool-up for the Sixties. Plan now to attend the largest, single-industry exposition ever held in the United States. Have your key personnel on hand, too. It's a once in five years chance to examine the latest technological advancements in automation through numerical controls and see why Modern Machine Tools = Production Efficiency!

Also see the **PRODUCTION ENGINEERING SHOW** on the Navy Pier. One registration covers both.

FORMULA FOR TOMORROW



International
Amphitheatre
Chicago, Illinois
Sept. 6-16

THE MACHINE TOOL EXPOSITION — 1960

For information write to

NATIONAL MACHINE TOOL BUILDERS ASSOCIATION

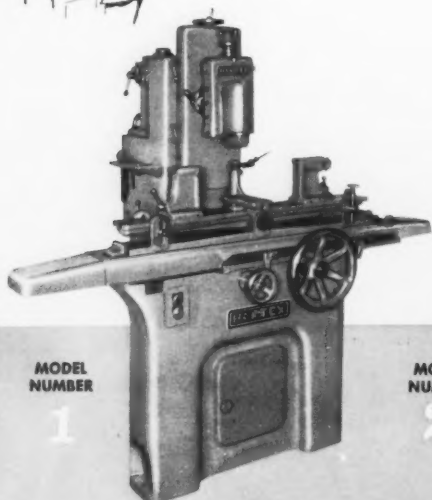
2139 Wisconsin Avenue, N.W. • Washington, D.C.

For more data circle 388 on Postpaid Card

Presenting ...
The Cutting Tool Manufacturer's



- Hartex Tool and Cutter Grinders were designed and developed by Union Twist Drill Company and have been proven in use by our machine operators for nearly half a century.



MODEL
NUMBER

1

UNIVERSAL CUTTER AND REAMER GRINDER

A vertical spindle grinder utilizing different types of cupped wheels for grinding clearances on straight or spiral flute cutters and reamers, mills, slitting saws, counter bores, and special cutters. Table travels on steel ball ways and fixture table tilts 5° in either direction. Swing over table is 12½" dia. — distance between centers, 31". Maximum table travel 29".



MODEL
NUMBER

2

FORMED CUTTER GRINDER

This wet grinder is a hand feed machine for sharpening straight or angular gash (right or left hand) and similar form cutters. Designed so that all teeth will be ground true to the axis of the cutter, the machine maintains the rake angle of the cutter tooth with an adjustable diamond which is set with a micrometer gauge, maximum cutter diameter is 8½", cutter thickness is 3½", and maximum rake angle is 30°.



HARTEX DIVISION (West Germany)

UNION

UNION TWIST DRILL COMPANY
Athol, Massachusetts



approach to cutter grinders

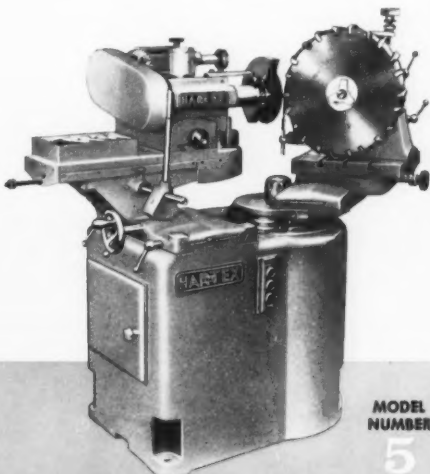
- Modern Hartex machines are the ultimate in ease of operation, quick setup and low grinding cost.
- These versatile grinders quickly and efficiently restore dull cutting tools to manufacturers' original accuracy.



MODEL
NUMBER
3

TANGENT — ARC PROFILE GRINDER

It's easy to get the feel of the work on this machine since both main wheelhead slide and swiveling workhead travel on ball bearing slides. Simple, quickly changed workholders facilitate grinding of radii and clearances on straight and spiral fluted milling cutters, side mills, angular cutters, end mills and ball mills and profile type milling cutters. Capacity of wheelhead movement is $5\frac{1}{2}$ " laterally and 10" transversely. Workhead swivels 210° and its slides move $3\frac{1}{4}$ " parallel to cutter axis and $12\frac{3}{4}$ " normal to cutter axis. Radius capacity $5\frac{1}{2}$ " — concave or convex.



MODEL
NUMBER
5

TANGENT — ARC PROFILE GRINDER

The number 5 is made for the maximum versatility in handling arbor type cutters up to 30" diameter and taper shank mills up to 18" over-all length. Despite its size it is still a positive, delicate machine in operation and will efficiently grind radii, clearances, and profiles on standard and special cutters. Capacity of wheelhead movement is $7\frac{1}{2}$ " laterally and $20\frac{1}{2}$ " transversely. Workhead swivels 210° and its slides move 11" parallel to cutter axis, $13\frac{1}{2}$ " normal to cutter axis, with an additional vertical adjustment of 5". Radius capacity $7\frac{1}{4}$ " — concave or convex.

These machines will be in operation at

BOOTH 1927
A.S.T.E. 1960 TOOL SHOW

Detroit Artillery Armory
April 21-28, 1960 Detroit, Michigan

You can get **FREE LITERATURE**
on this line of tool and cutter grinders
by sending us this coupon. ➡

UNION TWIST DRILL CO., Athol, Mass.

Gentlemen: Please send me the catalogs for the models checked below.

- | | |
|--|--|
| <input type="checkbox"/> Number 1 Universal Tool and Cutter Grinder | <input type="checkbox"/> Number 3 Tangent — Arc Profile Grinder |
| <input type="checkbox"/> Number 2 Formed Cutter Grinder | <input type="checkbox"/> Number 5 Tangent — Arc Profile Grinder |

Name: _____

Title: _____

Company: _____

Street: _____

City: _____

Zone: _____ State: _____

MMS

For more data circle 389 on Postpaid Card

April, 1960

MODERN MACHINE SHOP

81

UNIVERSAL JIG AND FIXTURE COMPONENTS AND CLAMP ASSEMBLIES

Shown here are a few of more than a thousand different items in regular steel and stainless steel—the largest and most complete selection in the United States—now available from Universal Engineering Co. Write today for your copy of the complete, new catalog.



213

OTHER PRECISION-BUILT COST SAVING UNIVERSAL PRODUCTION TOOLS



Floating Chuck



Standard Collet Chuck



Mikro-Lok Boring Bar



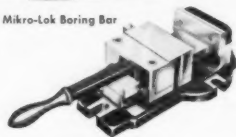
Boring Chuck



"Kwik-Switch"
Tool Holder



Standard Drill Bushing



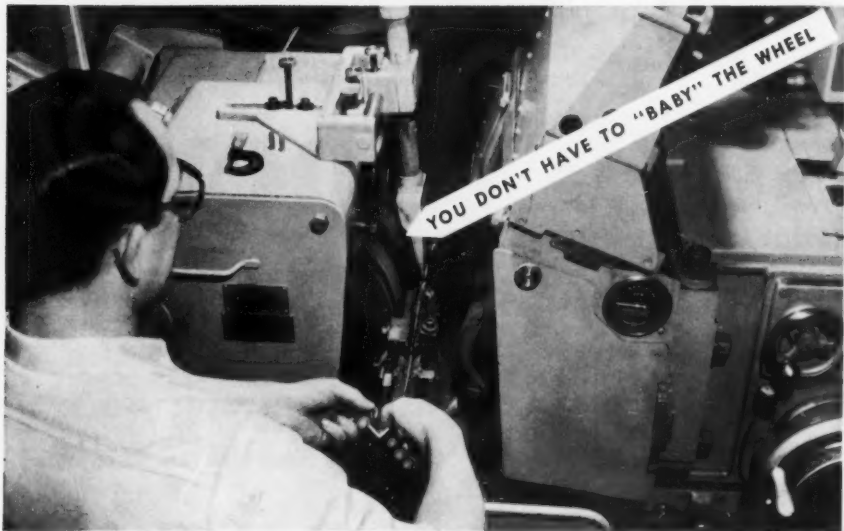
Wedge-Lock
Production Vise

UNIVERSAL ENGINEERING COMPANY, FRANKENMUTH 9, MICHIGAN

For more data circle 390 on Postpaid Card

Why General Electric Man-Made diamonds are better for you

HEAVY-DUTY WORK? G-E Man-Made diamonds can take it!



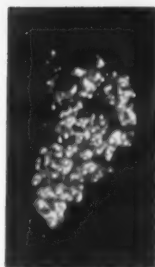
RVG diamonds—with optimized crystals—have built-in qualities that make them superior in wheels for all resinoid and vitrified grinding.

If yours is a heavy-duty grinding operation, wheels containing G-E Man-Made diamonds can take the punishment—and then some! Here's why:

General Electric has improved the crystal characteristics of its Man-Made industrial diamonds for resinoid and vitrified grinding (designated as type RVG). Manufactured under controlled conditions, G-E Man-Made diamonds are of optimum friability and shape to cover wider applications—everything from machining single-point tooling to grinding carbide-and-steel mixtures (even up to high ratios of 50-50!).

And because G-E Man-Made diamonds are irregular blocky crystals with rough surfaces, they stay bonded longer . . . so, you get more mileage per wheel. Wheels containing General Electric Man-Made industrial diamonds are available in ample supply to meet your needs.

Have you looked into the advantages of grinding wheels containing General Electric Man-Made diamonds lately? Better talk it over with your grinding wheel supplier today. Metallurgical Products Department of General Electric Company, 11109 E. 8 Mile Street, Detroit 32, Michigan.



G-E Man-Made industrial diamond (enlarged approximately 140 times) with optimized crystal characteristics can be used in wheels for every resinoid and vitrified grinding operation.

METALLURGICAL PRODUCTS DEPARTMENT

GENERAL  ELECTRIC

CARBOLLOY® CEMENTED CARBIDES • MAN-MADE DIAMONDS • MAGNETIC MATERIALS • THERMISTORS • THYRISTORS • VACUUM-MELTED ALLOYS

For more data circle 391 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 83



Core Drill: 25 sizes from 1/8" to 3" dia. in H.S.S.



C'sink, Style "B": 6 sizes from 1/8" to 2" dia. in H.S.S.



C'bore, Style "B": 32 sizes from 7/16" to 3" dia. in H.S.S. and carbide.

stub taper drive makes a difference in tool cost

Scully-Jones counterbores, countersinks, and core drills with stub taper drive reduce tooling costs three ways. Replacement cost is lower because these tools have two parts—a cutter with stub shank and a driver. Only the cutter is replaced when worn out. The tough, hardened steel holder can be reused time after time.

They save indirect costs, too, because short, yet rigid and accurate, stub taper shanks are easy to insert and eject. They speed setup and tool change. When countersinking follows core drilling or counter-

boring, you simply switch cutters—in seconds—the holder stays in the machine.

Other savings come from elimination of cutter damage and scrap. The tang on the stub taper shank mates with a slot in the holder—provides a positive, slipproof drive.

For complete information on this unique tooling method, see your Scully-Jones distributor or representative, or phone: Bishop 7-5900.

Scully-Jones and Company

1909 South Rockwell Street, Chicago 8, Illinois



Styles 1 and 2 holder with 20° flutes to aid chip removal.



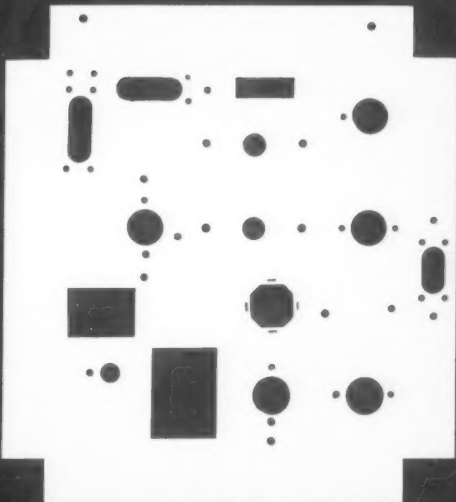
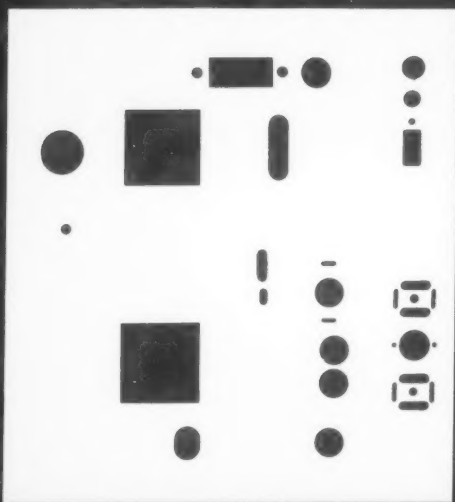
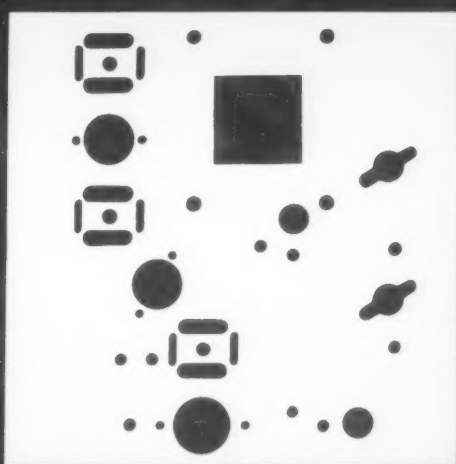
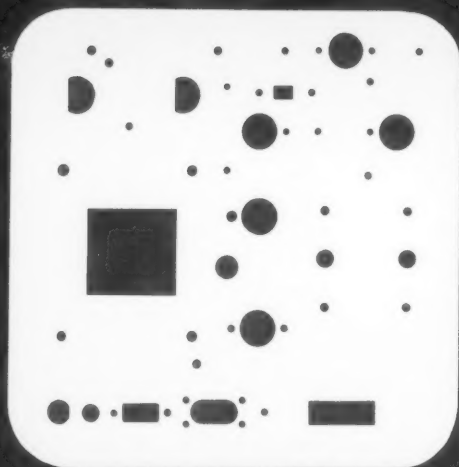
Style "B" holder for counterboring, countersinking and shallow core drilling.



**SCULLY
JONES**

**CUTTING
TOOLS**

For more data circle 392 on Postpaid Card



all four jobs
were punched with ONE
adjustable punch and die set



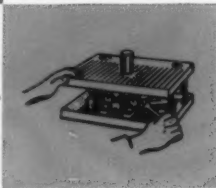
SELF-CLEANING DIE HOLDERS—Die holders have self-cleaning slug chutes—no need to bore holes in bolster plates.



INTERCHANGEABILITY—Punches and dies of similar size are completely interchangeable.

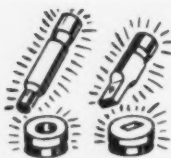


DUAL VERSATILITY—Di-Acro Adjustable Punches and Dies can be set up and aligned outside the punch press or inside the press.

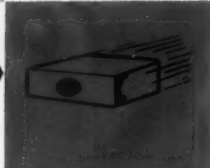


QUICK RADIAL ADJUSTMENT OF PUNCHES AND DIES—Punches and Dies can be revolved 360 degrees within the holders for perfect alignment due to circular locking grooves.

QUALITY MATERIALS—All punches and dies are high-quality, chrome alloy steel. Holders are steel castings to withstand continuous use.

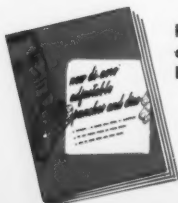


DELIVERY—You get immediate delivery from factory service department that handles nothing but punch and die orders.



di-acro adjustable punches and dies

Whether it is a short or long run job, Di-Acro Adjustable Punches and Dies save time and money where multiple holes of similar or varying size and shape are to be punched. They offer dual versatility in set up. Set-up can be made outside the press on one set while another die set is in the press running a job. Down time is virtually eliminated. The sets can also be set-up inside the press where it is necessary to add to an existing hole pattern. Di-Acro Adjustable Punches and Dies will do the job in a fraction of the time it would take using a single station punch press and at a lesser cost than a custom made die set. All punches and dies can be adjusted in a countless number of patterns so that multiple hole punching is accomplished in one operation. Holes can be as close together as $\frac{3}{4}$ " on centers. A template locates punches and dies accurately. Di-Acro Adjustable Punches and Dies can punch simple or complex patterns. Exclusive Uni-Lok radial adjustment allows 360 degree rotation of the punch and die for desired placement. All punches and dies are concentric and chance of misalignment is negligible.



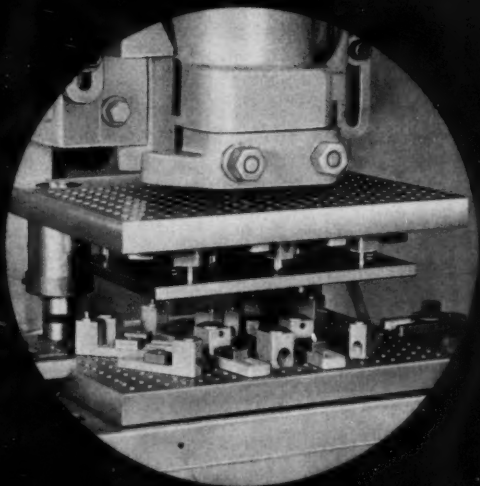
For your free copy of the new Di-Acro Adjustable Punches and Dies catalog, consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or mail the handy postage-free coupon to us.

See Di-Acro machines in operation
Booth 805 ASTE Show Detroit, April 21-28

O'Neil-Irwin Mfg. Co., 306 Eighth Ave., Lake City, Minnesota

Di-Acro Adjustable Punches and Dies offer you an inexpensive means of rapidly tooling for the simultaneous punching of multiple holes of a variety of shapes and sizes.

Because all component parts in the Di-Acro Adjustable Punch and Die Program are reuseable, you will find the equipment quickly pays for itself—often on the first job. Just file the template and you're ready to set up for a repeat run. You'll continue to use the equipment over and over again on a wide variety of jobs.



pronounced "die-ack-ro"

O'Neil-Irwin Manufacturing Co.
306 Eighth Ave., Lake City, Minn.

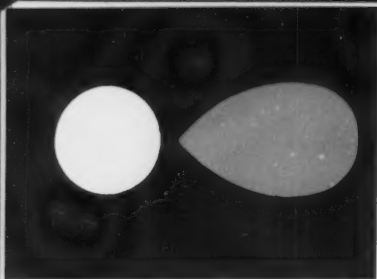
Please send me the Di-Acro Adjustable Punch and Die Catalog.

NAME _____

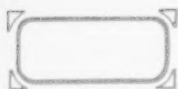
ADDRESS _____

CITY _____

STATE _____



NOTCHING



CORNER ROUNDING



RECEPTACLE



KEYHOLE



ELECTRICAL OUTLET
KNOCKOUT



D SHAPE



ELECTRONIC SPECIALS

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

FIRST CLASS
PERMIT NO. 13
Sec. 34.9 P. L. & R.,
Lake City, Minn.

O'NEIL-IRWIN MFG. CO.
306 EIGHTH AVENUE, LAKE CITY, MINNESOTA

Di-Acro Adjustable
Punches and Dies are
offered in four shank size
series. Punch and die
holder sets are available
for each series of round
and equivalent irregular
punches and dies.

Material capacity (all
series)—16 gauge mild
steel, $\frac{1}{8}$ " Aluminum.

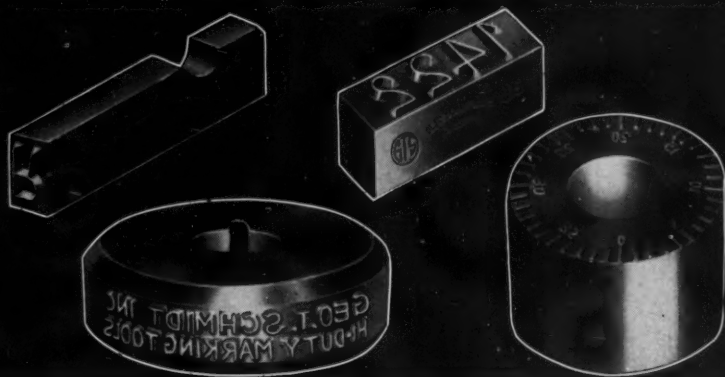
Di-Acro Adjustable
Punches and Dies come
in round, oval, rectangular
and square shapes. Also
available are other
equivalent irregular
shapes as shown.



pronounced "die-ack-ro"

O'Neil-Irwin Manufacturing Co.
306 Eighth Ave., Lake City, Minn.

here's why GTS marking tools offer ...TRUE LONG-RUN ECONOMY



Engraving Zone precision—performance proved steel—wide experience, ASSURES LONG TOOL LIFE

In the critical Engraving Zone, the faces and bevels of engraved characters must be cut with precision on selected tool steel . . . for tool performance stamina and sharp impressions.

Since GTS Marking Tools are precision cut from the proper steel, your markings are *clear, always uniform and easy-to-read*. GTS Marking Tools have proved their performance stamina. Years of wide experience, careful inspection and traditional craftsmanship assures you *long tool life* . . . and this means *true long-run economy*.

All GTS marking tools are of the *same high quality*, whether standard or special. *Fast, dependable delivery*, everywhere.

Our Marking Engineers can help you specify the right tools for maximum economy and efficiency. WRITE, WE'LL SEND COMPLETE CATALOG. If you prefer, call EAstgate 7-0300.

GEO. T. SCHMIDT, INC.

1806 W. BELLE PLAINE, CHICAGO 13, ILL.



IF IT'S WORTH MAKING, IT'S WORTH MARKING

For more data circle 393 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 85

CUT TIME! CUT COSTS!

CUT ALMOST ANYTHING IN SECONDS!



Speed & Cut

Abrasive Cutting Machines — manual or power-operated models for wet, dry or any-angle cutting!

No. 14 Power-Operated Model



BEAVER

Send for complete
catalog and name
of nearest distributor

**ABRASIVE MACHINE DIV.
BEAVER PIPE TOOLS, INC.**

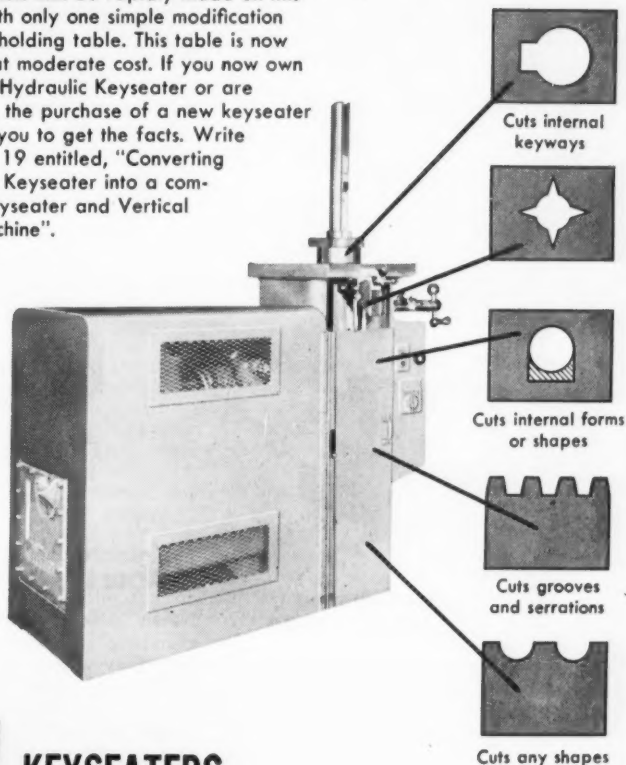
**DANA AVE.
WARREN, OHIO**

For more data circle 394 on Postpaid Card

TRIPLE THE USEFULNESS OF YOUR **M & M** KEYSEATER AND VERTICAL CUTTING MACHINE

Simple modification greatly increases productive capacity of this versatile machine.

An M & M Hydraulic Keyseater is not only a keyseater that cuts internal keyways up to 5" wide but a vertical cutting machine as well. Serrations, grooves, teeth—a wide variety of cuts can be rapidly made on this machine with only one simple modification — a work-holding table. This table is now available at moderate cost. If you now own an M & M Hydraulic Keyseater or are considering the purchase of a new keyseater it will pay you to get the facts. Write for Bulletin 19 entitled, "Converting the M & M Keyseater into a combination Keyseater and Vertical Cutting Machine".



M & M KEYSEATERS AND VERTICAL CUTTING MACHINES

MITTS & MERRILL • 1006 S. WATER ST. • SAGINAW, MICHIGAN

98

For more data circle 395 on Postpaid Card

KALAMAZOO

METAL CUTTING BAND SAW MACHINES

...there's a model to meet your needs



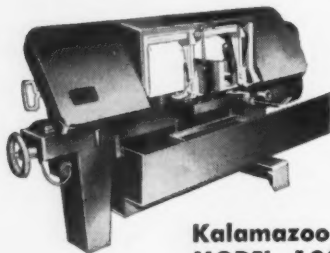
**Kalamazoo
MODEL 8C**

An all new design, first to meet today's metal cutting needs. Embodies years of Kalamazoo experience and the best industrial design talent. Cuts 8" round, 16" flat, 8" pipe. Available with or without coolant equipment.



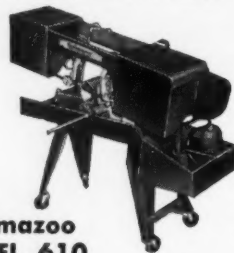
**Kalamazoo
MODEL 8CW-B1**

An automatic cut-off machine. \$1485, complete. A low cost, completely automatic operation, job tested and approved for accuracy and efficiency, using low cost carbon blades.



**Kalamazoo
MODEL 1220**

Where heavy-duty cutting is a problem, you'll find this rugged saw easy to use. Cuts 12" round, 20" flat. Available with or without coolant equipment.



**Kalamazoo
MODEL 610**

Here's a low-cost saw that heating, plumbing and electrical contractors go for! Easy to move around in the shop or take along to the job. Cuts 6" round and 10" flat. Available with or without coolant equipment.

It will pay you to investigate KALAMAZOO. Ask your dealer for a demonstration or write for descriptive literature and name of your nearest dealer.

MACHINE TOOL DIV. *Kalamazoo* TANK and SILO CO.

360 Harrison St.

• Kalamazoo, Michigan

For more data circle 396 on Postpaid Card

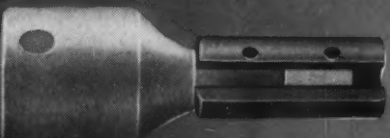
DOUBLE DOUBLE

the service life
of ordinary
**MAGNETIC
SOCKETS**

APEX
**REVERSIBLE
MAGNETIC
SOCKETS**



Cutaway views of Apex reversible magnetic socket, showing magnet in proper position before and after reversing. Magnet is easily repositioned by tapping gently on shank.



If you aren't using magnetic sockets, you may be overlooking a good way to trim assembly costs. If you are using magnetics, you can cut costs even more by specifying Apex *Reversible* Magnetic Sockets to get twice as much service from a single socket.

When one end of an Apex reversible magnetic socket becomes worn, simply turn the socket end for end, reposition the magnet, and you'll have a "new" socket

ready for work. Sockets are available with a full range of shank types and sizes to fit all popular makes of power and manual drivers.

Catalog 30-A lists the complete line of Apex magnetic sockets, for use with impact tools. Write, on your company letterhead please, for your copy. If you have an unusual fastening problem, we'll quote promptly on special sockets.

APEX FASTENING TOOLS

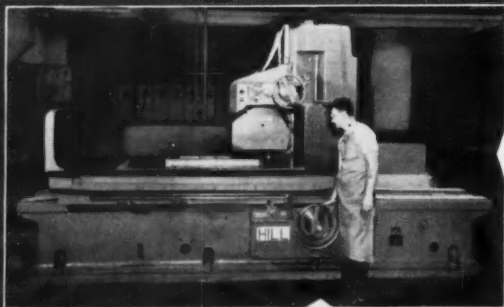
SCREWDRIVING • NUT RUNNING • SPECIAL

The APEX Machine & Tool Co. • 1027 So. Patterson Blvd. • Dayton 2, Ohio

For more data circle 397 on Postpaid Card

What HILL GRINDERS Have Done for Others They Will Do for YOU!

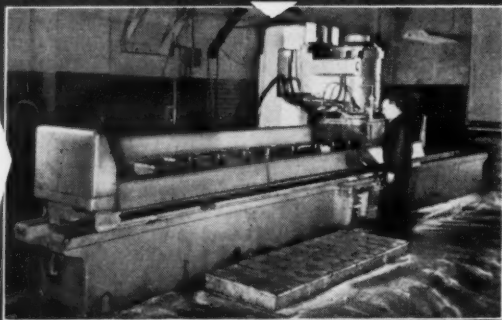
- Produce a smoother finish and closer tolerances.
- Increases man-hour production.
- Actual case histories prove definite worthwhile dollar savings over other methods



Use the "Hill" Horizontal Spindle Grinder for a wide range of grinding — flats, angles, irregular and special shaped surfaces — ideal for maintaining close tolerances with low micro inch finish. Made in table widths of 18", 24", 30" and 36" — table lengths from 5 to 20 feet.

- Built in both Horizontal Spindle and Vertical Spindle types.
- Choose the most efficient type for YOUR requirements.

Use the "Hill" Vertical Spindle Grinder for rapid stock removal and accurate grinding of flat surfaces — recommended for accuracy, speed and finish — features that mean increased precision production. Made in table widths of 18", 24" and 30" — table lengths from 5 to 20 feet.



THE HILL ACME COMPANY

1209 WEST 65th STREET • • • CLEVELAND 2, OHIO

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

For more data circle 398 on Postpaid Card

GET THE NEW, COMPLETE PICTURE

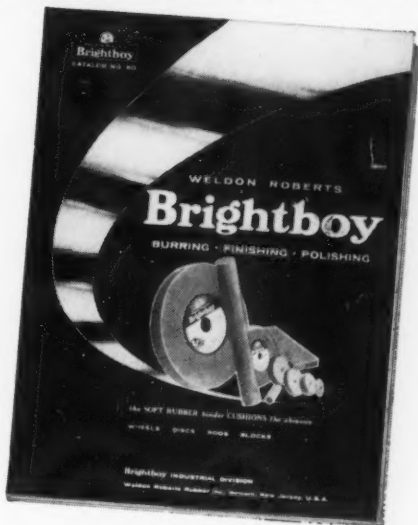
on MULTI-USE, SOFT RUBBER BONDED ABRASIVES
—THE ONLY COMPLETE, COMPREHENSIVE STOCK LINE!

The revealing, new medium for achieving bigger time savings, improved product quality . . .

—the revolutionary, new concept of abrasive uses!

Yours for the asking, the new Brightboy Catalog contains the latest working data, and product listings . . .

- Brightboy sizes, grains, textures, machine speeds, on all 49 readily available 'Job-Matched' stock compounds for machine and manual operations
- new and revised wheel sizes; center hole specifications conforming to American Standards safety specifications
- refreshing, new methods and applications.



No plant working in metals, wood, plastics or laminated materials should be without this new reference catalog outlining the exceptional advantages of rubber-cushioned abrasives. Write for it.



BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO.

95 North 13th Street

Newark 7, N. J.

America's Pioneer Manufacturer of Rubber Bonded Abrasives
For more data circle 399 on Postpaid Card



this plate paid for itself in 11 hours...



...and is still tapping 4400 holes per hour one year later!

The only tooling needed was the 15-position dial plate to hold the parts. The plate was bolted simply to a standard Snow Dial Index fixture on a standard Snow universal tapping machine.

We made the plate for our customer for \$165.00. It arrived in his plant 6 days after he delivered a box of blank parts to us. With the plate went a tag showing Snow machine settings, and estimated hourly production based on the test run already made in our own shop. Time required for customer to set up the new dial plate was ten minutes!

Standard universal Snow machines for drilling, tapping, or threading are available in vertical, horizontal or angular models. Their modest price will amaze you. They reduce changeover time, and cut tooling costs to a ridiculous minimum. 28 different types of standard air-operated fixtures are available from stock. On your next job, let us show you what the Snow method can do. Submit samples and prints.

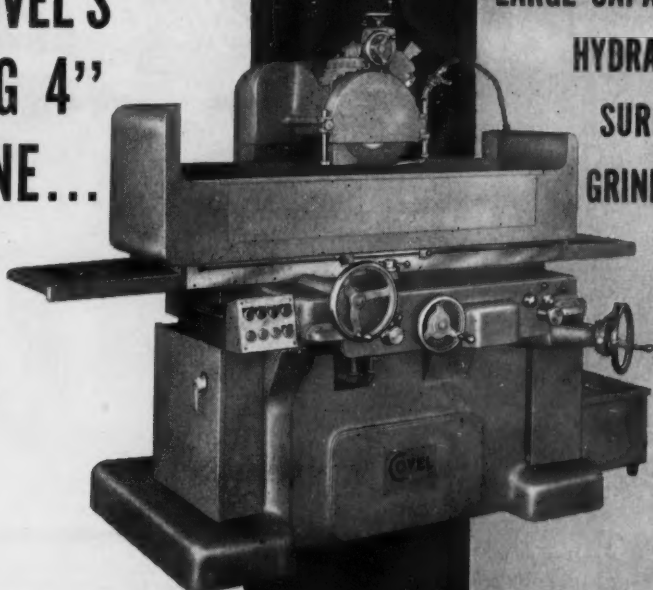
Snow Manufacturing Company, 435 Eastern Avenue, Dept. C, Bellwood, Illinois (suburb of Chicago).

SNOW

master fixtures save dollars and days in tooling costs.

For more data circle 400 on Postpaid Card

COVEL'S "BIG 4" LINE...



LARGE CAPACITY HYDRAULIC SURFACE GRINDERS

Yours — for no more than you would pay for ordinary machines — surface grinders that enable you to handle die grinding, jig and fixture grinding and production work fast and efficiently. These Covell Surface Grinders — with their hard chrome tableways and other top-quality features — assure you micro-precision performance at lowest possible cost. Your investment in a Covell will pay off many times over — ask any Covell owner.

Covell No. 35B
grinds work
8" x 24" x 18" high

Covell No. 60
grinds work
14" x 24" x 18" high

Covell No. 60B
grinds work
12" x 36" x 18" high

Covell No. 80
grinds work
18" x 36" x 18" high



Micro-Precision a Covell Tradition — Since 1874

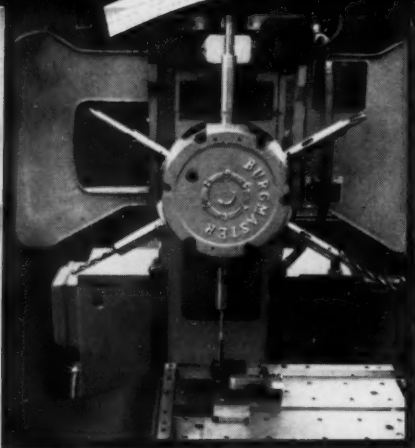
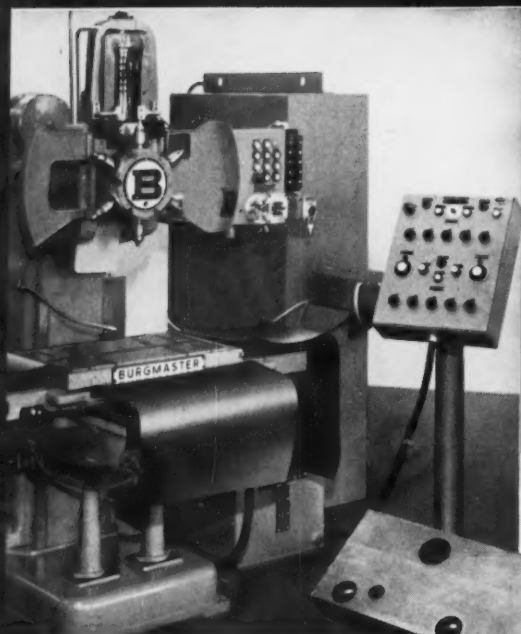
**PRECISION
GRINDERS**

BENTON HARBOR, MICHIGAN

Write, wire or call TODAY for complete information and prices on the complete line of Covell Precision Grinders. Ask for Bulletin M40.

For more data circle 401 on Postpaid Card

Layout Eliminated, Faster Mfg., BURGMASTER *tape controlled*



This steel drill plate involving drilling 7 holes, c'oring 3 holes, boring and reaming 4 holes was taped in 35 minutes and machined in 31 minutes to tolerances of $\pm .002''$. Note the simple set-up.

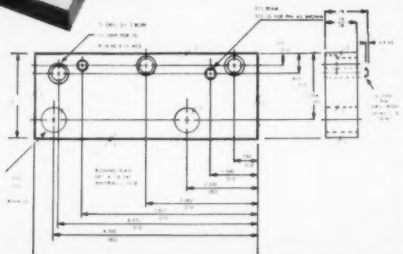
The Machine Tool Exposition
Booth No. 301—Amphitheatre

1960



Simple Tooling, Faster Manufacturing, Lower Costs. Note the simplicity of mounting work on the table for performing a multiplicity of machining operations of $\pm .002''$. In a short time approximately 1000 tapes have been made. Tapes are tooling stored for future use — and when parts are repeated — savings snowball.

Note proper method for dimensioning drawing to facilitate tape making. Tapes are standard 1" wide, 8 hole, punched on a Flexowriter type-writer.



World's Largest Builder of Turret Drilling Machines



"0" Manual
Power Index
1/4" Capacity



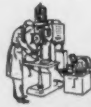
1C Manual
Power Index
3/8" Capacity



2B Manual
Power Index
3/4" Capacity



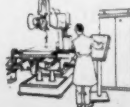
2BR Ram Type
Radial Drill
3/4" Capacity



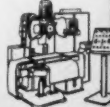
2BH Automatic
Hydraulic
3/4" Capacity



3BH Automatic
Hydraulic
1 1/4" Capacity



25AH Automatic
Tape Controlled
1 1/4" Capacity



2BHT-3BHT Automatic
Tape Controlled
3/4" and 1 1/4" Capacity

Less Fitting on Small Lots with...

TURRET DRILLING MACHINE

(at The Ingersoll Milling Machine Co., Rockford, Illinois)

Savings in a number of important indirect ways are made at the Ingersoll Milling Machine Company, Manufacturers of Special Machine Tools, with their Burgmaster Tape Controlled 6 Spindle Turret Drilling, Tapping and Boring Machine. Most of their work comes in single pieces or small lot quantities, which would rarely justify drill jigs or fixtures. Tape Controls are assisting in solving their problems as follows:

- Hand layout is eliminated.
- Improved accuracy reduces fitting.
- Important lead time savings are accomplished.
- The machine is more productive and results in manufacturing savings compared with previous equipment.
- Holes are accurately located.
- Holes are accurately machined because the machine is rigid.

Maximum Flexible Automation

The standard adjustable Burgmaster controls permit the machine to be quickly set up from one job to another. These include pre-selective spindle speeds, infinitely variable pre-selective feeds, selective rapid approach and return, skip indexing, depth control, and simple manual controls for set up.

The G. E. numerical system controls all machine functions, selects spindles in any sequence, automatically positions the table on two axis, clamps the table while machining operations are performed, and controls coolant. Up to 6 or 8 different operations can be performed at any command position without moving the table, or as many cycles using one tool as desired, without indexing. All operations are carried out at their most efficient rate for high finish, precision, speed, and longest tool life.

Savings in tooling and many other indirect ways will quickly pay for a Tape Controlled Burgmaster. Get the facts on your work—there is no obligation.

JOB FACTS

Machine:	Burgmaster 6 Spindle Tape Controlled Turret Drilling, Boring and Tapping Machine.
Company:	The Ingersoll Milling Machine Company, Rockford, Illinois.
Part:	Drill Bushing Plate
Lot Size:	One
Holding:	Simple Clamp — located in corner strips.
Operations:	Drill 7 holes, C'bore 3 holes, Ream 4 holes.
Material:	1018 Steel — $\frac{1}{4}$ " thick.
Tolerance:	Hole Location $\pm .002$ ", $\pm .000$ Reamed Hole — .001
Former Method:	Hand layout for drill 9 minutes Drill and c'bore 9 minutes Bore & ream 4 holes 66 minutes 84 minutes total
Former Machine:	Box column vertical single spindle drilling machine and precision jig boring and milling machine.
Present Method:	Punch tape for Burgmaster 35 minutes (5 mins. per hole) Drill, c'bore and ream 31 minutes 66 minutes total
Time Savings:	18 minutes first time, next run 53 minutes as tape is now in stock.
Other Advantages:	Indirect Savings: layout eliminated, faster manufacturing, improved accuracy, less fitting, less trucking, faster repair service, direct machine time savings.

Write for Bulletin describing Burgmaster 6 and 8 Spindle Tape Controlled Turret Drilling, Tapping and Boring Machines. Thirty-minute 16mm sound film showing all Burgmaster Turret Drills in operation is available from any office without charge.



BURG TOOL

MANUFACTURING COMPANY, INC.

15001 South Figueroa Street, Gardena, California
FAculty 1-3510 DAvis 9-4158



Circle 402

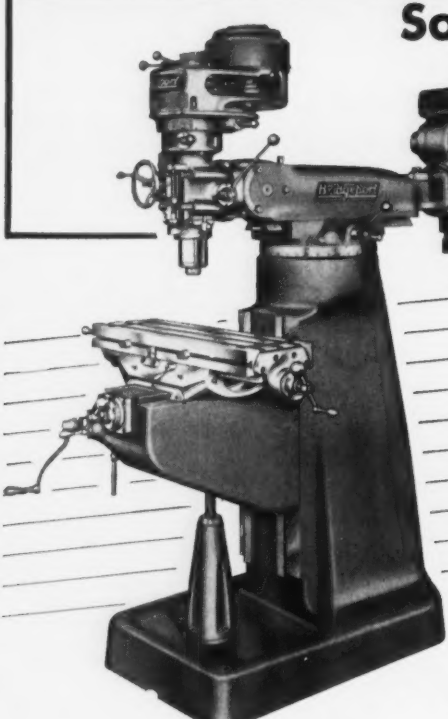
BURGMASER DIRECT SALES OFFICES:

Ridgewood, N.J.
86 North Maple Ave.
Gilbert 4-3002

Chicago 25, Ill.
4908 Lincoln Ave.
LOng Beach 1-1178
Cleveland 7, Ohio
14706 Detroit Ave.
ACademy 6-7030

Detroit 37, Mich.
13730 W. Eight Mile Rd.
Lincoln 8-4333
San Francisco, Calif.

Plus dealer
representatives in other
industrial centers.



So you want **VERSATILITY?**

Here it is . . .

MILLING
DRILLING
BORING
RIGHT ANGLE MILLING
SLOTTING
CHERRYING
FLY CUTTING
PROFILING
HYDRAULIC DUPLICATING

with the
Bridgeport

"THE MOST FOR THE LEAST"

... for example:

... all operations featured here are performed on BRIDGEPORT TURRET MILLING MACHINES, at all angles of the work, without changing set up.

... production speeds for a wide range of work with precision maintained.

... profitable production assured on a single machine in the tool room or on many in production regardless of operations.

... small shops as well as large are assured attractive returns on a modest investment within the reach of all.

... a machine where price has been maintained on a remarkably even keel under constantly rising costs of manufacture and where quality, capacity and range of operations have been stepped up and extended year after year.

... where versatility has been extended through constant development of attachments.

These are a few of the many reasons why BRIDGEPORT can logically stress "VERSATILITY" and why the "Most for the Least" is an accurate way to describe this outstanding machine tool.

Further details are available through your nearest dealer or from us direct.

Bridgeport MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines

For more data circle 403 on Postpaid Card

It's new....

It's here...

It's the

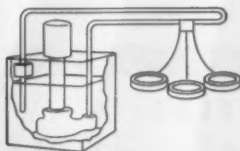
NEW LAPMASTER

FEATURING:

✓ Automatic Control of Lap Plate
Flatness



✓ New Abrasive Distribution
System



The completely new Lapmaster gives you automatic lap plate flatness control... PLUS... the ultimate in abrasive handling efficiency with a brand new compound distribution system... new, compact design... larger, wrap around work table to facilitate loading and unloading.

Automatic sensing head detects errors in lap plate flatness within one light band... automatically shifts conditioning rings to compensate... assures absolutely uniform lapped surfaces from the first piece to the last, without operators' attention and... eliminates human error and rejects.

New abrasive dispensing system keeps mixture of lapping compound and vehicle consistent... assures uniform distribution... equal rate of stock removal of all parts... adjustable flow control... no clogging.

See the New Lapmaster in Operation at Booth 420,
ASTE Show, Detroit, April 21-28

... get all the facts on this
spectacular new machine... and ask for
our new catalog covering all other
Lapmaster models.



A product of
Crane Packing Company
64 Oakten Street, Morton Grove, Illinois

In Canada: Crane Packing Company, Ltd., Hamilton, Ont.

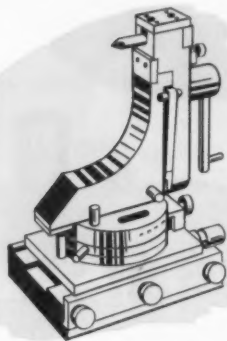
For more data circle 404 on Postpaid Card



You get day - in
with J & S

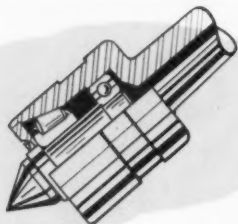
WHEEL DRESSERS

Hardened, ground & lapped. .0001" accuracy. Forms wheels to shape on surface grinders, tool and cutter grinders, cylindrical grinders, grinders.



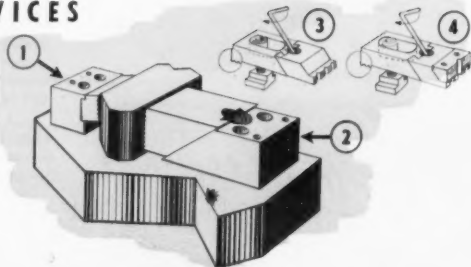
CENTERS

the only guaranteed self-adjusting live centers. Accuracy better than .0001". Greatest selection of "standard" and "special" live centers.



DOWN-HOLDING DEVICES

secure workpieces quickly and rigidly, for all needs.



day - out economy precision - crafted products

J & S FLUIDMOTION Wheel Dressers

dress tangent in one continuous motion—two angles tangent to concave or convex radii—concave radius of 180°. Simple dressing of complex forms with .001" accuracy for all types of surface and cylindrical grinders. Also new compound micrometer wheel guard adapts Model F in an inverted position on surface and visual grinders.

Complete Line of Precision-Built Live Centers

featuring one-year guarantee, self-adjusting bearing take-up, RPM speeds to meet capacity of modern machines, correct capacity ratings, hardened and ground throughout. Plus expansion compensators and divided thrust for maximum load.

Down-holding Devices for Any Requirement

famous for faster set-ups, stronger grip, less obstruction. Shown at left are: 1. Counter clamp, 2. Fixture clamp, 3. "Jumbo" and 4. "Li'l Giant" jaw clamps.

Write for free data on any or all the above products.

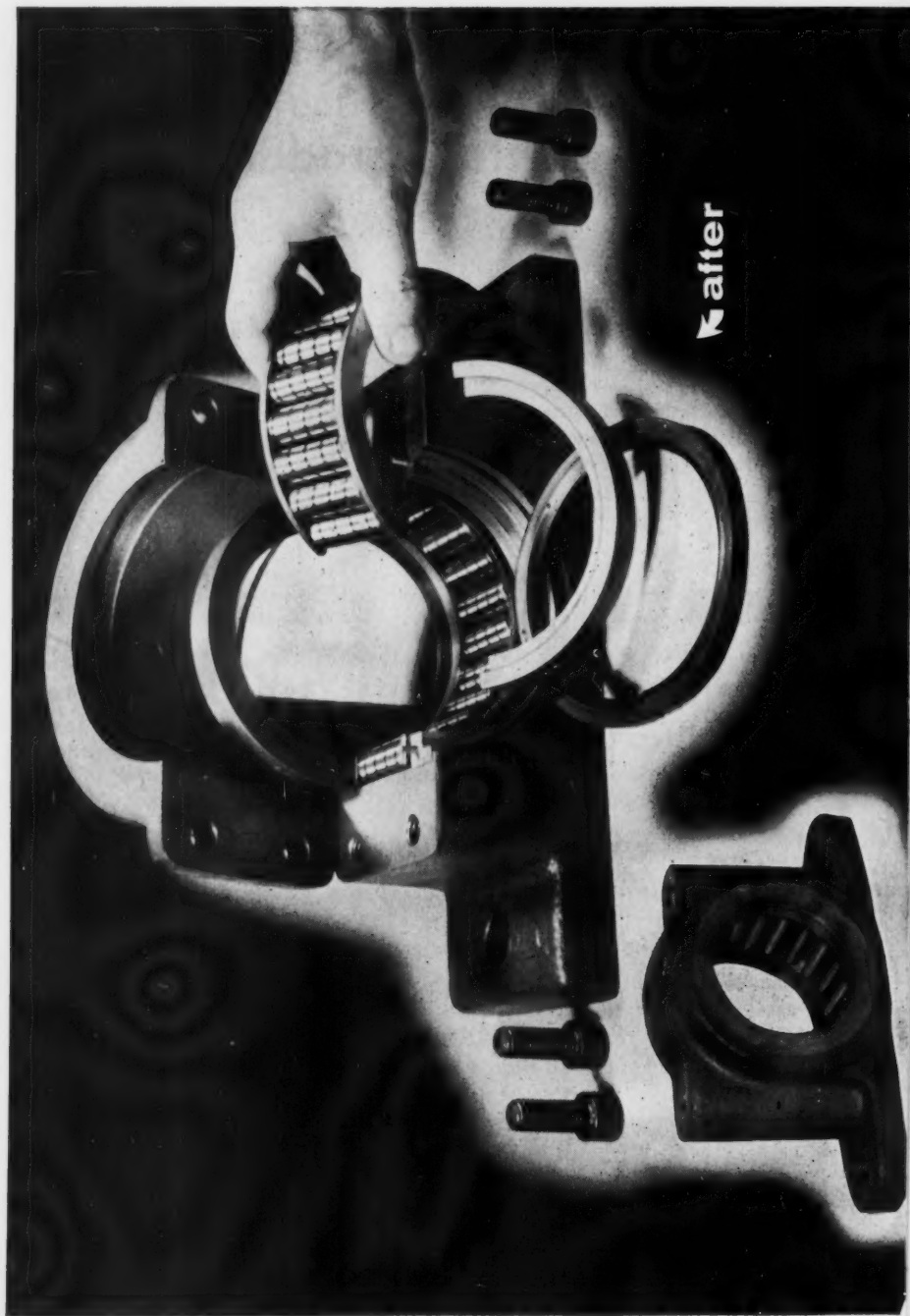
We're at Booth 2116 ASTME Tool Show

J & S TOOL CO., INC.

871 DORSA AVE., LIVINGSTON, N. J.

WYman 2-3181

For more data circle 405 on Postpaid Card



before

Here's a "before" and "after" bearing problem solved by **Bearings, Inc.**

A large steel mill customer has six cranes with bridge line shafts equipped with the solid housing pillow blocks shown in the "before" photograph. Whenever one of the line shaft bearings needed to be replaced, the entire section of shaft had to be removed. Maintenance costs and crane downtime were excessive and costly. Our engineers were asked for a solution.

THE PROBLEM: Due to the extremely low base to center of shaft dimension of the original bearing, a conventional split housing, split roller bearing pillow block could not be used.

THE ANSWER: We designed and furnished a special split housing pillow block (see "after" photo) incorporating split bearings and split seals which maintain the original dimensions. These can be installed or replaced on the crane in a fraction of the time formerly required just to dismantle the line shaft.

This is just one of many successful solutions of a tough bearing problem. We can help you solve your bearing problems and supply replacement bearings from the stock carrying branch near you. We're authorized distributors for all nationally known bearings. Call us!

BEARINGS, INC.

*Providing bearing service
in the North*

and

in the South

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Lockland • Mansfield • Painesville • Toledo • Youngstown
INDIANA: Zanesville • Ft. Wayne • Indianapolis • Muncie • Terra Haute • **PENNSYLVANIA:** Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Parkersburg • Wheeling • **NEW JERSEY:** Camden • Newark
NEW YORK: Balanrol Corp., Buffalo • Niagara Falls • **MARYLAND:** Baltimore • **DELAWARE:** Wilmington

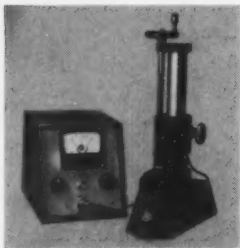
DIXIE BEARINGS, INC.

FLORIDA: Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge • New Orleans
N. CAROLINA: Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport • Knoxville • Nashville
VIRGINIA: Norfolk • Richmond

For more data circle 406 on Postpaid Card

how to
MICROtol[®]

machine tools...

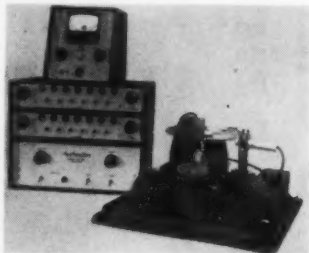


for MICROtolerance Inspection

The MICROtol Standard Comparator Amplifier (16011) shown here is one of four units designed for precise, reliable dimensional inspection in a variety of applications. The building block concept makes all MICROtol units extremely versatile as components of either user-built or AIL custom-built systems.

for Fast Automatic Selection

Operated in combination with selected accessory units the 16011 amplifier is readily adapted to automatic sorting. Here it is shown with the MICROtol 16082 classifier in a high precision production sorting operation.



for Precise Continuous Control

The addition of appropriate logic and decision making MICROtol units provides complete feedback control. A typical system, shown here, combines the high accuracy and reliability of MICROtol units with our unique linear actuator—the INCHWORM[®].

**Trade Mark*

LET US PROVE this outstanding electronic gaging and control equipment in your plant!

Call your Cutler-Hammer sales engineer or write —



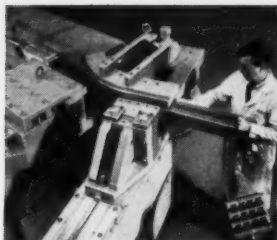
AIRBORNE INSTRUMENTS LABORATORY

DEER PARK, LONG ISLAND, NEW YORK

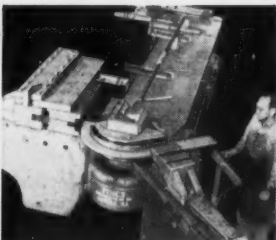
A DIVISION OF CUTLER-HAMMER INC.



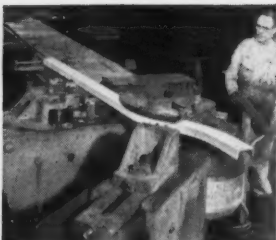
For more data circle 407 on Postpaid Card



HEAVY RECTANGULAR TUBES—accurately formed on Pines Model 4 on a 54° inside radius for air cushion assembly on heavy duty truck chassis. Material is $4" \times 5\frac{1}{2}" \times .300"$ wall.



SOLID STEEL BEAMS—cold edge bending of $5\frac{1}{2}" \times 1\frac{1}{4}"$ steel bars on Pines Model 4 replaces hot bending on dross, produces more accurate parts at lower cost for road machinery manufacturers.

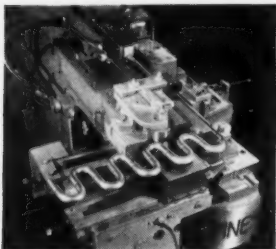


ALUMINUM CHANNELS—rigged machine construction and tooling on Pines Model 3 Machine cold forms $4" \times 1\frac{1}{2}" \times .320"$ aluminum channel without wrinkling or distorting. Spring-back is controlled by simple machine settings.

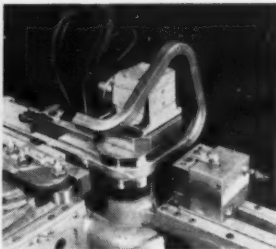
FOR COST CUTTING IDEAS

INVESTIGATE PRODUCTION BENDING THE "PINES-WAY"

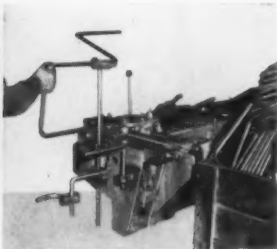
When you have a production job requiring the cold forming of parts from round, square, rectangular, extruded, or hollow stock to an even radius, or to different angles, we suggest you investigate the cost cutting advantages of production bending the Pines-way. The examples shown here illustrate a few of the many different and varied applications which are today profitably produced on Pines machines. Cold bending is a fast, accurate, easy to control metal forming process that is today more profitably applied in the production of an ever increasing variety of products. Call on Pines engineers for assistance without obligation on any specific job.



COPPER SERPENTINE BENDS— $\frac{1}{4}"$ O.D. $\times .035"$ copper tubing is rapidly formed on this Model $\frac{1}{4}$ into serpentine coils on a $1"$ cl. A simple gang-slitting operation produces 180° return bends.



WRINKLE-FREE SQUARE TUBE BENDING—Model 1 Machine, equipped with flexible mandrel and self-opening bending form, produces top quality office and hospital equipment at speeds of 350 bends per hour.



FAST ROUND-TUBE BENDING—Pines Model $\frac{1}{8}$ Machines speed production of tubular dinette and lawn furniture. Fast, automatic cycling and accurate progressive bending produce 600 to 900 bends per hour.

PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery 642 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY
For more data circle 408 on Postpaid Card

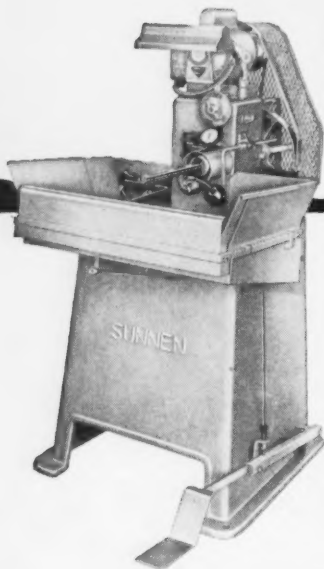


Booth 1839

SUNNEN HONING

MAY SOLVE YOUR HOLE PROBLEMS

see us at the **ASTME SHOW**
April 21-28 in booth 1155



WRITE FOR FREE BULLETINS
 OR ENGINEERING SERVICE



WRITE FOR FREE BULLETIN

- 1. ROUNDNESS**—Produces geometrically-round holes; corrects any out-of-round pattern caused by chucking, heat treating or previous operations—with minimum stock in the workpiece.
- 2. STRAIGHTNESS**—Levels all internal irregularities for end-to-end precision. Corrects taper, waviness, bow, hour glass, barrel, bell mouth, etc.
- 3. DIAMETER**—Quick, economical precision sizing—with production tolerances down to .0001", or as close as .000025" if needed.
- 4. SURFACE FINISH**—Produces consistent finish down to 2 micro-inches in hardened materials—no heat checks or smear metal. Diameter range .120" to 2 5/8". Hones open or blind holes, in almost any material from steel to glass. Average installation cost under \$1,000. No jigs or fixtures, no chucking, no set-up time.

SUNNEN PORTABLE HONES

... size and finish holes anywhere
 in any position

The tools of a thousand uses. Invaluable for small lot production... for large or heavy parts... sizing or correcting undersized, tapered, or out-of-round bores in parts... for "on-the-job" hole re-sizing on machine repairs.

Requires no expensive set-up time; eliminates costly down time; maintains alignment. Fast stock removal, smooth surface finish, accuracy within .0005". Diameter range 1 3/4" to 20 1/2". Powered by portable electric drill. (Can also be used in drill press or radial drill.)

SUNNEN®
 PRODUCTS COMPANY

FREE FIELD ENGINEERING

ANYWHERE IN U. S.

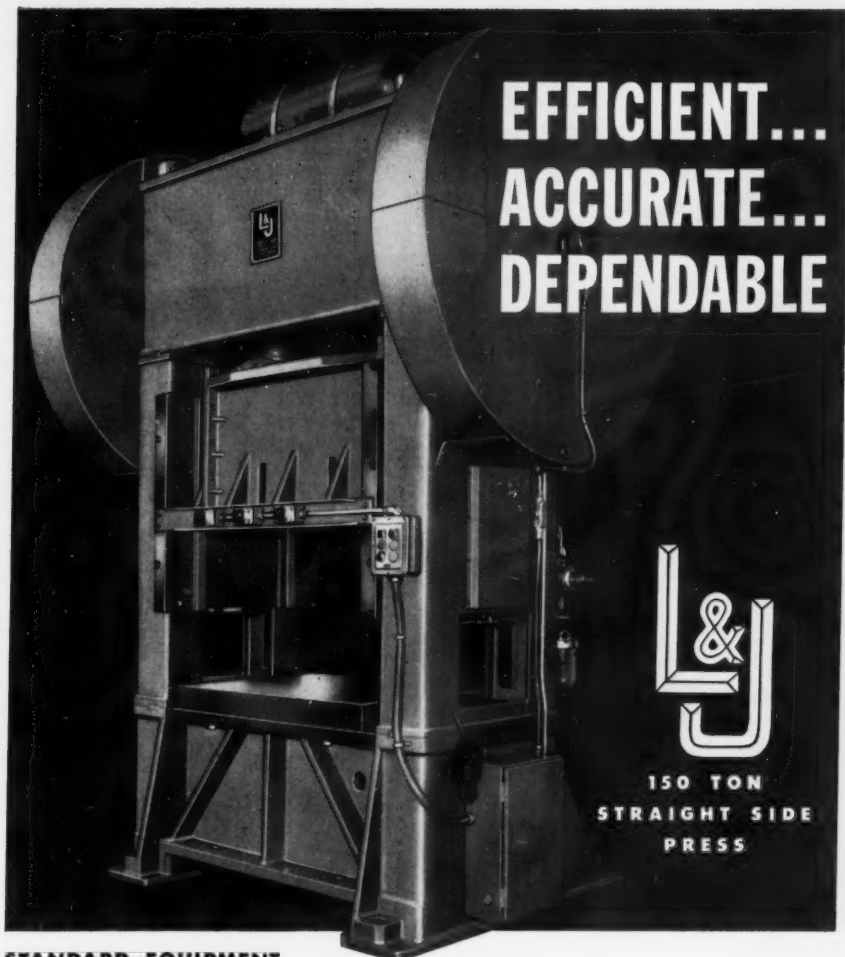
HONING

For more data circle 409 on Postpaid Card

7924 MANCHESTER AVE., ST. LOUIS 17, MO.

CANADIAN FACTORY: CHATHAM, ONTARIO

8540RX



**EFFICIENT...
ACCURATE...
DEPENDABLE**



**150 TON
STRAIGHT SIDE
PRESS**

**STANDARD EQUIPMENT
ALL HIGH QUALITY**

Including—Air clutch. Shaft driven limit switch. Dual air valve. Replaceable wear strips on slide. Hard bronze crankshaft bearings. Replaceable ball seats. Gears run in oil.

Write for catalog . . . also O.B.I. and gap frame presses.

- Single geared, twin end drive, double crank . . . maximum quality.
- Long, square gibbing maintains alignment.
- Heavy welded steel box-type frame with tensioned tie rods insures rigidity.
- Large die space — 36" x 48" slide face, 36" x 48" bolster area.

L & J PRESS CORPORATION

1624 STERLING AVE.
ELKHART, IND.

For more data circle 410 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 105



TOOLROOM GRINDERS

**MANY UNUSUAL FEATURES
ASSURE HIGH EFFICIENCY**

MODEL 310 CUTTER AND TOOL GRINDER

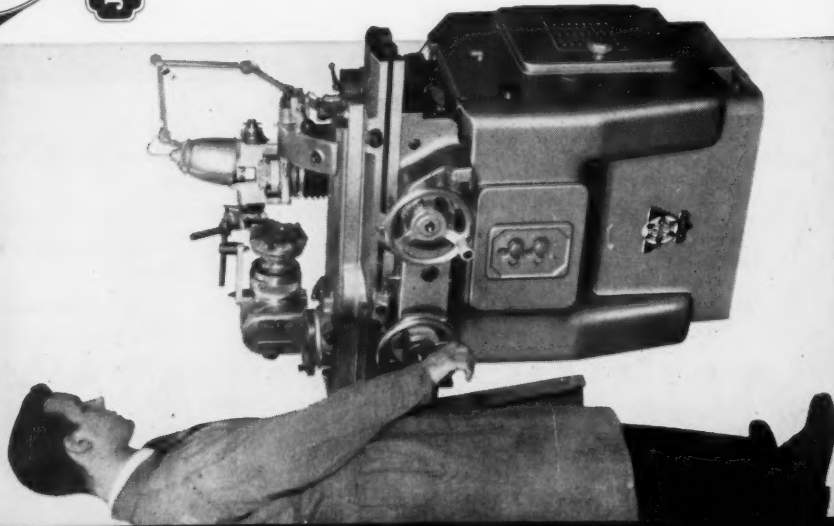
This grinder efficiently performs a wide range of grinding operations. Thus, tools and cutters can be ground in shortest possible time to keep production costs at a minimum.

FEATURES:

Universal operating positions—all within comfortable reach of operator

- Anti-friction cross saddle mounting assures sensitive control to cross feed
- Table traverses on precision roller chains, giving "fingertip" control
- Table dogs reversible—one end spring loaded and the other a dead stop
- Table swivels a full 90 degrees in left-hand direction and 45 degrees right-hand
- Large diameter wheel spindle, mounted on specially selected preloaded bearings
- Universal Cutter Head adjustable to swing from 8" to 12" diameters
- Cutter Head and Tailstock provided with clearance angle setting adjustments.

For additional information, write for Micromatic Bulletin 139W.



MODEL 1014 UNIVERSAL TOOLROOM GRINDER

This 1014 Universal Tool Room Grinder is designed to give extraordinary sensitive control that results in high quality external and internal grinding.

Wheelhead has deep throat capacity and wheel position is centralized in relation to table. This permits surface grinding and offers special facilities for broach grinding.

The extra Universal Cutterhead extends the versatility of this highly accurate machine to cover tool and cutter grinding.

FEATURES:

Hand cross feed and vertical feed in .0001" increments • Auto cross feed per reversal of table of .0001" to .007" over .025" (reduction in work diameter of .050") • Automatic table traverse, 4 speeds provided. Micrometer adjustment to table traverse in .001" divisions • Wheelhead saddle on anti-friction mountings • Precision built wheelhead motor on anti-vibration mountings • Wheel spindle unit swivels full 360° • Five external grinding wheel speeds • Grinding wheels fitted on either end of wheel spindle. Nitralloy spindle runs in plain bearings • Vernier scales to wheelhead and table swivels • Fast cross traverse to wheelhead for setting purposes.

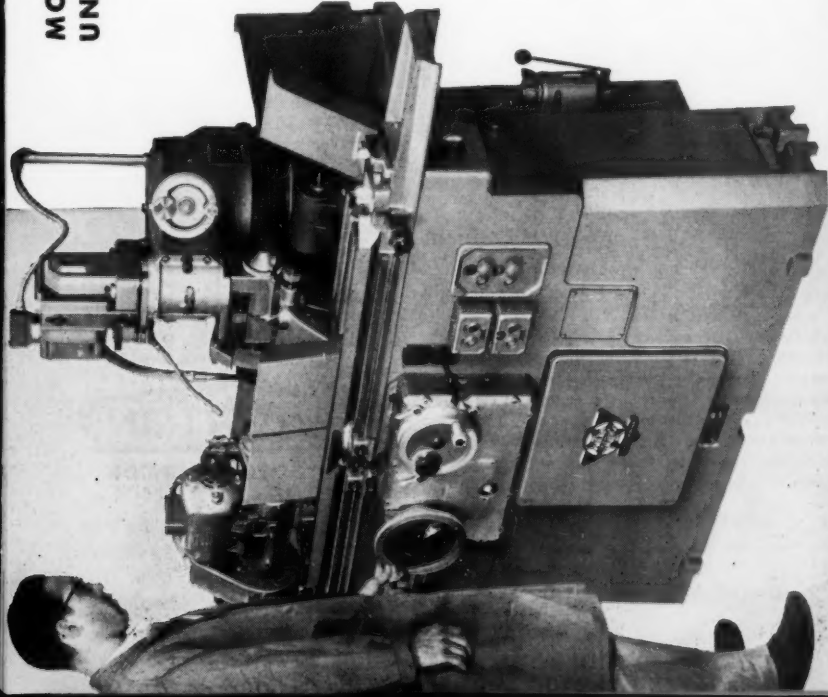
For additional information, send for Micromatic Bulletin 206Q.

For more data circle 411 on Postpaid Card



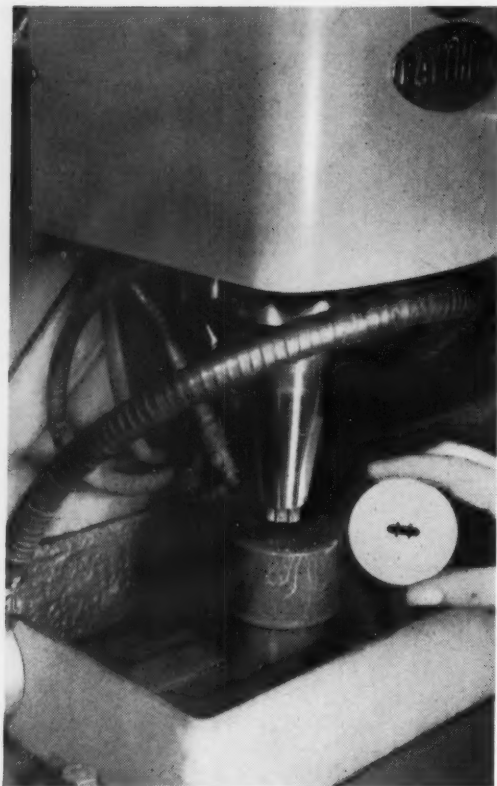
MICROMATIC HONE CORP.

8100 SCHOOLCRAFT AVENUE • DETROIT 38, MICHIGAN



Ultrasonic Machining calls for ultra-modern abrasive

... NORBIDE* boron carbide



The Raytheon Company, a leading manufacturer of ultrasonic machine tools, recommends NORBIDE abrasive grain as the ideal cutting agent for ultrasonic grinding applications. Ultrasonic Machine Tools convert electric current into mechanical vibrations at rates up to 25,000 cycles per second, and drive abrasive against the work with an impact force 150,000 times the abrasive's own weight, in so doing they can machine an exact counterpart of the shaped tool face into the workpiece, as shown here.

With the tremendous increase in the demand for accuracy beyond the range of conventional machining, Norton NORBIDE abrasive is a vital aid to the exceptionally high precision performance of modern ultrasonic machine tools.

NORBIDE boron carbide grain is second only to diamonds in hardness. Compared to silicon carbide grain, it provides the same degree of finish, but being less friable maintains size and speed of cut for a much longer period of time.

Ultrasonic machining is of major importance in the electronics and metalworking industries, as well as in the manufacture of intricate jewelry and fine glass and laboratory ware. Materials machined include alumina, carbon blocks, ceramics, diamondite, ferrite, germanium, granite, graphite, silicon, tungsten, mother-of-pearl, sapphire, tool steel, carbide and other alloys. Operations include shaping, slicing, trepanning, engraving, cutting of intaglios, dicing, drilling and multi-drilling. In all applications, on all materials, NORBIDE abrasive grain is essential to high precision, sharp-edge accuracy without chipping, distorting or otherwise damaging the workpiece.

Your Norton Man can give you details on how ultrasonic machining with NORBIDE abrasive may improve and economize your production. See your Norton Distributor or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries

NORTON
BORON CARBIDE

G 391

75 years of... Making better products... to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Retractors • Electrochemicals — BURNHAMMING DIVISION: Coated Abrasives • Sharpening Stones • Pressure Sensitive Tapes

For more data circle 412 on Postpaid Card



Introducing the NEW MODEL 1-A SEVER-ALL Machine... CUTS AT 3 to 6 SECONDS PER SQUARE INCH—ECONOMICALLY

LOW COST • Priced at less than \$500, delivered.

BIG CAPACITY • Up to 2" square solids, 3½" O. D. pipe and tubing, 3" angle iron, and 4" channels. Wheel oscillation, an exclusive feature in this price range, provides this *above-average* capacity.

SPEED • Cuts a 2" x 2" hardened steel bar in 16 seconds . . . practically any metal at 3 to 6 seconds per square inch.

QUALITY • Clean, smooth cuts, even on large sections, because wheel oscillation provides cooler cutting.

VERSATILITY • Cuts cold rolled, stainless, and alloyed steel; cast iron; and non-ferrous metals.

ECONOMY • Occupies minimum floor space . . . eliminates annealing costs . . . gives more cuts per wheel as a result of oscillation.

SIMPLICITY • Just two SEVER-ALL cutting wheel specifications will do *all* your SEVER-ALL cutting jobs. Little or no set-up time required.

NEW SEVER-ALL


AVAILABLE FROM DISTRIBUTORS

Very likely your own distributor already stocks the Model 1-A SEVER-ALL Abrasive Cutting Machine and Wheels. If not, we'll give you the name of your nearest SEVER-ALL distributor. We'll also be glad to send you complete details on this new machine. Just ask for Bulletin DH-106.

ALLISON-CAMPBELL DIVISION AMERICAN CHAIN & CABLE

931 Connecticut Avenue, Bridgeport 2, Conn.
For more data circle 413 on Postpaid Card





"Do you know that a SPEEDLAP
removes material from a flat surface
faster than most grinders and
accurate within millionths of an inch?"



Address SPEEDLAP CORPORATION
8022 N. Monticello Ave., Skokie, Ill.

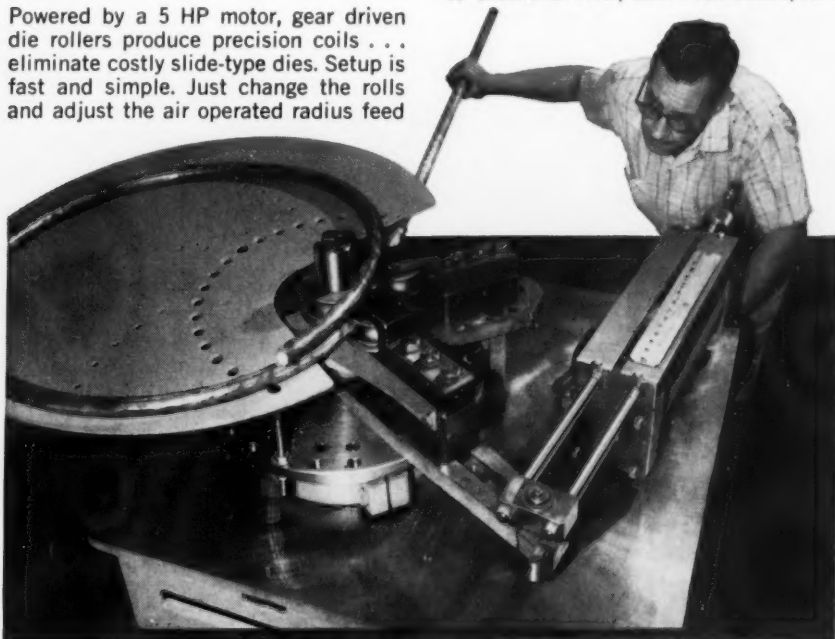
Introducing the
versatile new
CURVIT C-155 COILER
with infinitely variable
diameter control

One flick, changes diameter . . . that quick! Yes, one simple control infinitely adjusts coiling diameter. Exceptionally versatile, the new Curvit C-155 will coil pipe, tube, flat stock, and solid bars — from $\frac{3}{4}$ " to $2\frac{1}{2}$ " in diameter, depending upon material being coiled. Production speed is variable, too, from 15' to 30' per minute . . . faster, if required.

Powered by a 5 HP motor, gear driven die rollers produce precision coils . . . eliminate costly slide-type dies. Setup is fast and simple. Just change the rolls and adjust the air operated radius feed

with one calibrated knob. No need for highly skilled personnel. Simple rugged design and ready accessibility of all working parts minimizes maintenance. Write for complete information.

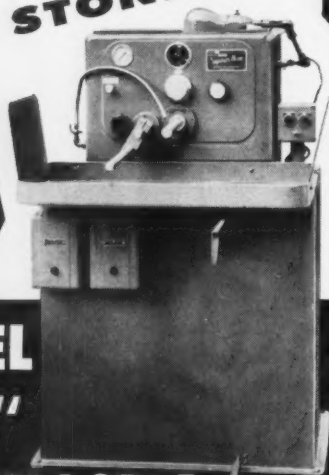
CURVIT division
MACLODYNE CORPORATION
19 Grosvenor Ave., East Providence, R. I.



For more data circle 415 on Postpaid Card

*Let Superior
Help You—*

**SHORTEN
HONING TIME
•
ACHIEVE A
BETTER FINISH
•
CUT
PRODUCTION
COST
•
EXTEND
STONE LIFE**



**MODEL
"HM"
HONEMASTER**

Adjustable hydraulic system assures constant stone pressure, continuous cutting with no fall off due to wear or stock removal.

Infinitely variable speed (250 to 1150 rpm).

Single control dial shows when first piece is coming to finish size. Set, then thereafter just compensate for stone wear.

Hydraulic clutch and brake.

Stocked in all principal cities. Send for details and prices.

SUPERIOR HONE CORPORATION

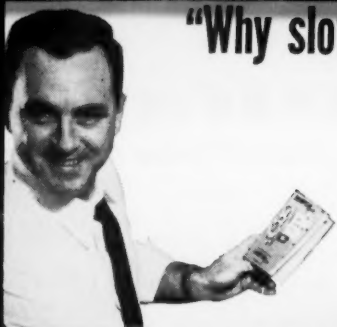
1615 ELRENO STREET

ELKHART, INDIANA

For more data circle 416 on Postpaid Card

112 MODERN MACHINE SHOP

April, 1960



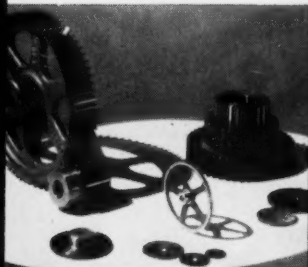
"Why slow up the job with special gears?"

when you can select what you need
from over 2000 standardized

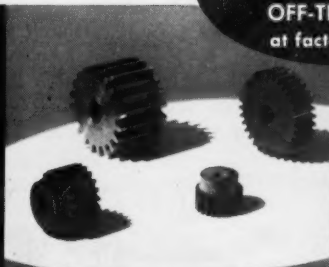
BOSTON GEARS

FROM STOCK

OFF-THE-SHELF
at factory prices



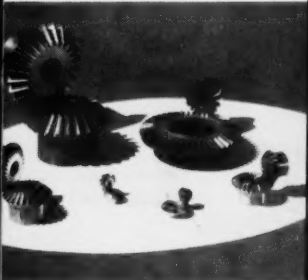
SPUR GEARS — STEEL, IRON, BRASS
14½° and 20° P.A. .208" to 40" P.D.



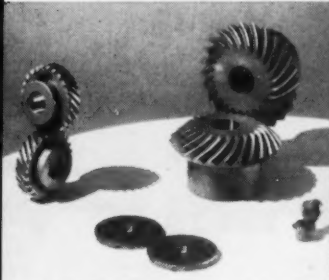
NON-METALLIC SPUR GEARS
14½° and 20° P.A. .938" to 6.667" P.D.



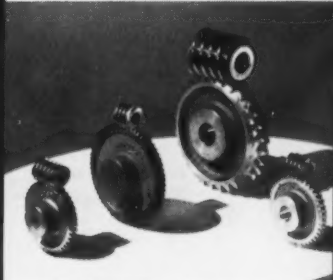
RACK • PINION WIRE
Steel and Brass 14½° and 20° P.A.
PINIONS • INTERNAL GEARS



BEVEL and MITER GEARS
Steel, Iron, and Brass 20° P.A.
.312" to 14" P.D.



STEEL SPIRAL MITERS 1" to 5" P.D.
HELICAL GEARS
Steel and Bronze .333" to 6" P.D.



WORM GEARS Bronze and Iron
.417" to 18" P.D. **WORMS** .333" to 4" P.D.
Soft Steel and hardened and ground steel

9496

**STANDARDIZED
TRANSMISSION
PRODUCTS**

Stock Gears
Sprockets and Chain
Speed Reducers
Bearings • Couplings
Shaft Supports
Pulleys



Take a good look through the BOSTON Gear catalog. You'll find standardized types and sizes to fit most of today's transmission needs. Why pay more (and wait) for gears made to order? Design around BOSTON Gear. It saves time and money in planning, in purchasing, in production . . . and you simplify servicing problems. Boston Gear Works, 68 Hayward Street, Quincy, Mass.

CALL YOUR

BOSTON *Gear*
DISTRIBUTOR

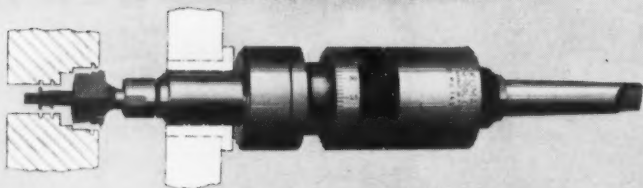
— STANDARDIZATION PAYS —



BOKUMATIC RECESS TOOL[®]

quick change feature

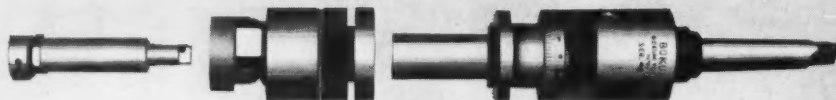
How it Works



1. Standard Model B holder with quick change adapter and pilot to fit in bushing plate assembly.



2. Remove quick-change adapter and thrust bearing.



3. Replace with thrust bearing-pilot combination and Model B-1 quick change adapter.



4. Standard Model B-1 holder and quick change adapter and pilot to work off part.

HOLDERS

permits you to work off fixture—off part

LOOK at these plus-value advantages

- ▶ Only recess tool holder available with quick-change adapter.
- ▶ Holder convertible to off-center style for deeper recessing by changing to off-center type adapters.
- ▶ Holder uses straight shank cutting tools, reducing cost of perishable tools.
- ▶ Specially designed taper collet holds cutting tool in place. Holder can be used either vertically or horizontally.
- ▶ Holder convertible from jig fixture piloting to work piece piloting.
- ▶ Holder actuated by two cam pins 180° apart for smooth chatter-free recessing.
- ▶ Cam pins accessible for easy replacement.
- ▶ Replaceable tool holder shanks are located by two pilots for positive concentricity.
- ▶ Circular tools can be used since holder actuates cutting tool in special radial path.
- ▶ Cutting tool can be preset in quick-change adapter as to depth into part before tool holder is assembled.

Write today for catalog 80-1-60 Dept. B

BOKUM TOOL COMPANY, INC.

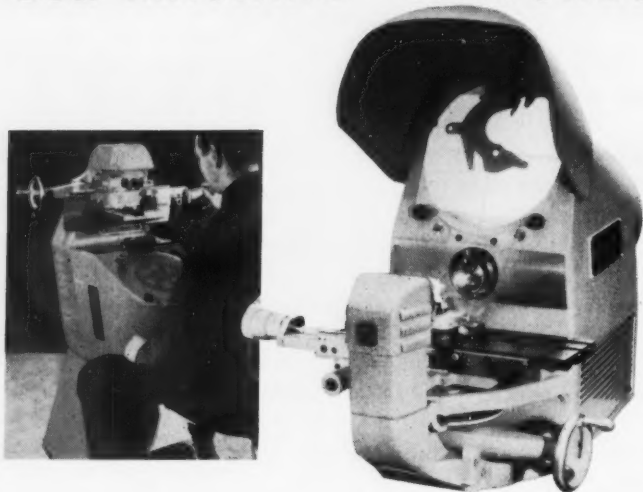


14775 WILDEMERE AVENUE

DETROIT 38, MICHIGAN

For more data circle 418 on Postpaid Card

J & L presents AN ECONOMY-SIZE OPTICAL COMPARATOR with "BIG MACHINE" FEATURES



Now, for the first time, the most important features of "big" optical comparators have been combined in a relatively inexpensive machine, the J & L TC-10. As a result, medium and small producers can greatly improve their quality control procedures.

The TC-10 offers such features as: direct-reading measuring facilities; density of shadow without distortion; precise optics without adjustment; machine tool design for stability; ease of operation; versatility of application, and assured accuracy.

BONUS! The new 5x, 2" aperture lens, especially designed for this machine, provides comparison inspection capacity and accuracy never before available in a machine of this size.

See the TC-10 in operation at Booth No. 1208, ASTE Show or write for folder #GL-6000.

"the world's oldest and largest maker of optical comparators"

JONES & LAMSON



COMPARATOR
DIVISION

MACHINE COMPANY 520 Clinton Street, Springfield, Vermont

For more data circle 419 on Postpaid Card

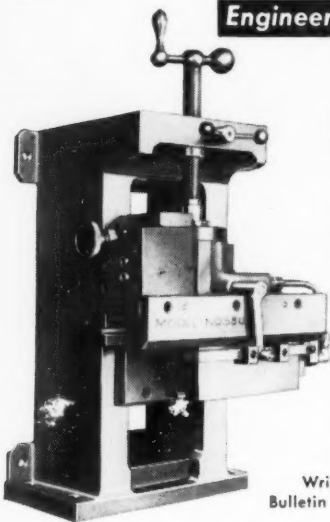
Looks GOOD But— WHO MADE IT?

You'll get more orders, more repeat business with clearly identified products. They sell easier. Essential identification, of your part or product, can best be obtained *permanently* by steel stamp marking of trademarks, serial numbers, part numbers, model numbers, dates, etc.



Engineered Marking by CADILLAC . . . cuts costs

CADILLAC NO. 58U HYDRAULIC MARKING UNIT

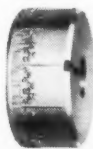


Meets the needs of automatic and automated production processes for a standard marking unit—can be mounted in any position—upside down . . . sideways . . . or at any angle. The only completely hydraulic marking unit, employing the roll marking principle, that permits the marking of parts while in a fixed position.

Also available with our standard base and complete with built-in oil reservoir, oil filter, motor and pump system pressure regulator, foot actuator, and all electrical controls.

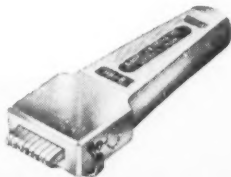
Write for
Bulletin No. 58U.

**CADILLAC STAMAX*
GRADUATING ROLL DIES**
Strong and tough . . .
resist great side pressures
and tensions.



**HAND HOLDER
INTERCHANGEABLE
STAMAX* TYPE INSERTS**

For marking part and detail
numbers, dates, inspection
marks, tool checks, name
plates, etc.



For further information regarding marking devices and equipment, write for Bulletin No. 41.

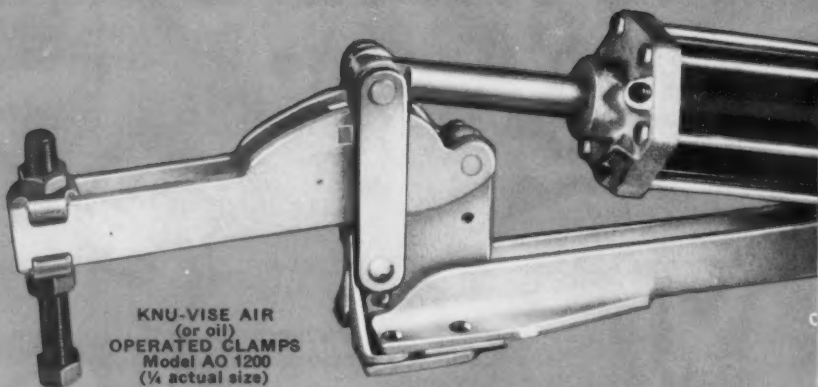
*STAMAX means
Carefully selected al-
loys specially heat
treated and tempered



CADILLAC STAMP CO.
17311 RYAN ROAD • DETROIT 12, MICH.
TELEPHONE: FOREST 6-0500

For more data circle 420 on Postpaid Card

Give tough



*** In the aircraft industry—**

Knu-Vise air-operated clamps are used for holding air frame components during drilling operations.

*** In the refrigeration industry—**

More than 100 refrigerator inner door panels per hour are vacuum formed on an automatic machine using Knu-Vise air clamps.

*** In the automotive parts industry—**

A fixture using Knu-Vise air clamps holds center hubs for arc welding into housings for automatic transmissions.

*** In the construction industry—**

Knu-Vise air clamps are used on a work fixture for bonding galvanized steel sheet to steel channels.

*** In the truck industry—**

Truck cowl and plenum assemblies are placed in position, clamped and spot welded in 60 seconds on a special fixture using Knu-Vise air clamps.

*** In the automobile industry—**

Sedan roof panels are clamped on a fixture and 47 holes are simultaneously drilled. Knu-Vise air clamps help develop a production rate of 67 jobs per hour.

**Manufacturers of more than
150 models of manually and air-operated
clamps and pliers**

clamping jobs the air



...and speed production

...reduce operator fatigue

...improve quality control

These are just a few of the many applications of Knu-Vise air-operated toggle action clamps used throughout industry. There are many hundreds more where Knu-Vise hand-operated clamps, pliers and C-clamps are standard equipment. Lapeer makes clamps in miniature sizes as well as big, brawny models for tough jobs. Lapeer clamping engineers can give you valuable assistance and are glad to discuss your clamping problem at any time. Write today for full information.

**KNU-VISE
PRODUCTS**

**3048 DAVISON ROAD
LAPEER, MICHIGAN**

LAPEER MANUFACTURING CO.

**WESTERN DIV.: PECK and LEWIS CORPORATION
4436 Long Beach Ave., Los Angeles 58, Calif., ADams 3-7146**

**CANADIAN DIV.: HIGGINSON EQUIP. SALES LTD.
1131 Pettit Road, Burlington, Ontario**

NOW!
YOU'RE PAYING
FOR A
Robbins
MAGNA-SINE



YOU don't have a Magna-Sine? You're paying for one of these Robbins sine plates anyway! Why? Because angular setups on machining, grinding or inspection operations, which require hours by other methods, take just minutes with a Robbins Magna-Sine. The cost of lost man-hours on just a few angular setups in your shop would pay for one of these precision magnetic Magna-Sines or non-magnetic sine plates.

With this Robbins angular tooling equipment you can set up any angle in just four simple steps: (1) from "Table of Constants" furnished, find required angle; (2) select gage blocks indicated; (3) place blocks between sine plate base and bar swivel block; (4) secure work to sine plate—you're ready to grind, machine or inspect work.

Using Robbins precision sine plates is fast, simple and sure—you eliminate V-blocks, angle plates and complicated "build-ups". A complete range of models and sizes are available to meet the needs of any shop, large or small. You're paying for a Magna-Sine, you should have one.

Catalog MS-58 describes the complete line of Robbins Magna-Sines and non-magnetic sine plates, send for your free copy.

OMER E. Robbins COMPANY

11961 Dixie Ave. Dept. B Detroit 39, Michigan

For more data circle 422 on Postpaid Card

J-8358

modern machine shop

ADVERTISING REPRESENTATIVES

George E. Hay, 431 Main St., Cincinnati 2, Ohio, CHerry 1-5924. Western Pennsylvania, Western New York, Ohio, Kentucky, Southern Indiana.

Jeryl L. Marlatt, 1051 Brooklawn Rd., Birmingham, Mich., MIDwest 6-5935. Eastern Michigan, Northwestern Ohio.

Norman S. Rogers, 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Central Indiana.

Gene J. Schwarber, Advertising Manager, 431 Main Street, Cincinnati 2, Ohio, CHerry 1-5924. Missouri, Kansas.

Duncan W. Barton, 60 E. 42nd St., New York 17, N. Y., Murray Hill 7-7390. Eastern Pennsylvania, Central New York State, New Jersey, Maryland, Delaware, Washington, D. C., Long Island, Brooklyn.

Granville M. Fillmore, Vice President, 60 E. 42nd St., New York 17, N. Y., Murray Hill 7-7390. Eastern New York State, Connecticut, Massachusetts, Rhode Island, Vermont, New Hampshire, Maine.

John M. Krings, Vice President, Room 211-A, 540 N. Michigan Ave., Chicago 11, Illinois, DELaware 7-5441. Western Michigan, Illinois, Wisconsin, Iowa, Minnesota, the Dakotas, Northern Indiana.

The Robert W. Walker Company, 730 South Western Ave., Los Angeles 5, Calif., DUNkirk 7-4388, 57 Post St., San Francisco 4, Calif., SUTter 1-5568. California, Oregon, Washington.

★ ★ ★ ★

**Circulation over 54,000—
largest in metalworking field**

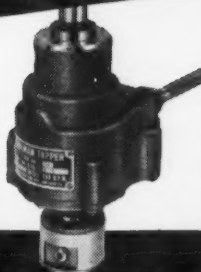
April, 1960

DORMAN

automatic reverse

TAPPERS

convert any drill press
to tapping



IMMEDIATE DELIVERY!

priced from \$65

- Fast, LOW COST tapping
- Automatic torque control
- 1 Minute to attach or remove
- Assures precision threads
- 4 sizes...capacities #2-56 to 2"
- Adapts to external threading
- Taps most metals and materials
- Takes wide range of taps
- Easy to tap...no skill required
- Time savers...money makers

Bulletin FREE for the asking!



1030 North Plum St., Lancaster, Penna.

Also headquarters for Adj. & Fixed Center Drillheads
Subsidiary of Thomson Industries, Inc., makers of
BALL BEARINGS, NYLINED Bearings, 60 Case Shafing

For more data circle 423 on Postpaid Card

MODERN MACHINE SHOP 117



Fred W. Vogel

Over the Editor's Desk

ASTME TOOL SHOW

With this issue we present a veritable Tool Show in print. Every effort has been made to make this issue complete—with program, floor plans, and descriptions of tools, machines and materials. Those readers who may have the opportunity to attend the Show in person will be fortunate indeed, but for those who may not attend, this issue is designed to fill their needs.

★ ★ ★ modern machine shop ★ ★ ★

GREAT MAN PASSES

Many people engaged in metalworking activities were saddened a few weeks ago when they learned of the passing away at the age of 101 of Henry Marx, former president of the G. A. Gray Company. Mr. Marx led an unusually long, active and full life, a life of unselfish service in the machine tool industry where he was universally admired and respected.

After working for various machine tool companies, Mr. Marx joined the G. A. Gray Company in 1889 as a general agent and engineer in charge of erecting machinery. In 1905, he became president of the company and remained in that post until 1952 when he became chairman of the board. He retired as chairman in 1959.

In 1955, during the year-long celebration of ASME's 75th Anniversary, Mr. Marx was presented with a special certificate and anniversary medal commemorating his 75 years of membership. His citation for distinguished service read in part: "Mr. Marx is the only living member of the group of engineers who, in the year 1880, established The American Society of Mechanical Engineers. It is to this group that we owe the benefits that have come since then to engineers, to engineering, and to society as a whole from the many-fold activities of ASME."

Metalworking has indeed lost a friend and truly great man.

EASY MATH. AT YOUR FINGER TIPS

SAVE TIME AND MATERIAL

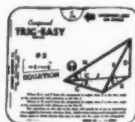
There are many layouts and setups that require calculation . . . your engineering cannot furnish all of them . . . if your workmen are using TRIG-EASY METHODS of calculating then you are "saving time and material" and avoiding trial and error methods. This is money in your pocket!

Using these equation charts you can calculate in higher mathematics. No previous training necessary.

PLANE ANGLES

Trig-Easy chart for plane angles and dimensions. (As shown).

50c POSTPAID



COMPOUND ANGLES

Trig-Easy chart with pocket manual over 140 pages, 60 drawings, 6 decimal trig-function table for compound angles and dimensions in machine set up, etc.

\$1.75 POSTPAID

CHARTS FOR ELECTRICAL ENGINEERS AND LOGARITHM TEXT BOOKS!

SOLD BY EUGENE DIETZGEN CO. NATIONALLY SINCE 1943

EVERYTHING FOR DRAFTING — SURVEYING — BLUEPRINTING

NEW YORK	•	PHILADELPHIA	•	PITTSBURGH	•	MILWAUKEE	•	DENVER
CHICAGO	•	NEW ORLEANS	•	WASHINGTON, D. C.	•	SAN FRANCISCO		
KANSAS CITY, MO.	•	LOS ANGELES	•	OAKLAND, CALIF.	•	SEATTLE	•	CINCINNATI

and DIETZGEN dealers in all principal cities.

FOR MAIL ORDERS AND DESCRIPTIVE LITERATURE

WRITE THE MANUFACTURER BOX 587, DEPT. 11
EARL H. NEEDHAM CULVER CITY, CALIFORNIA

PLEASE
No Stamps
No C.O.D. Under \$1.00

For more data circle 424 on Postpaid Card

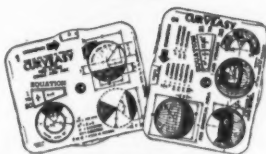


Thousands of these charts used by draftsmen, tool, die and jig makers, machinists, students, inspectors, template makers and designers. EACH CHART HAS INSTRUCTIONS TO SHOW YOU HOW TO DO IT.

HANDY PACK COMPLETE!

THREE TRIG-EASY CHARTS for plane, spherical and compound angles. Complete with booklets in container.

\$3.00 POSTPAID



CURVEASY SET

Two charts with pocket manual of over 60 pages. 50 drawings for section areas and volumes of a circle sphere, ellipse and parabola; cylinders, cone and frustum.

\$2.50 POSTPAID



SPHERICAL ANGLES

Trig-Easy chart for spherical angles and dimensions.

75c POSTPAID

Over the Editor's Desk . . .

GRINDING TECHNIQUES

Brand new markets are developing for grinding wheels capable of handling today's exotic new materials, George P. Burns, Vice President, Van Norman Machine Co., told a group of wheel manufacturers and representatives who were recently meeting in Grand Rapids.

As an example of developments taking place in the machine tool industry, Mr. Burns cited new crush forming techniques for both centerless and center grinding machines. "These new techniques," he said, "resulted from industry's need for machines which will reduce production costs, provide versatility and still hold extremely close tolerances with new and exotic materials. Crush dressing is in its infancy, and there is a lot to be learned about its application. But, if wheel manufacturers can come up with a more consistent wheel selection for these new materials, entirely new markets will be opened up."

Mr. Burns stressed the point that centerless grinding, a development with which he has been closely associated, has become an accepted method of grinding. With the addition of crush dressing to the centerless grinder, new markets have been made available. He cited such features as infeed, thru-feed and crush-form grinding, constant precision and automatic operation as advantages designed to meet the demands of modern industry.

Crush grinding, he pointed out, steps up production by eliminating turning problems. There is no longer any need for continual check on machine accuracy. It also combines several steps into one operation.

★ ★ ★ modern machine shop ★ ★ ★

MMT=PE

From the January issue on, many of you readers have noticed and commented on the initial letters heading this item and which have appeared in each issue as part of a "teaser" advertising and publicity campaign. The time has now come to reveal the meaning of the letters. MMT=PE stands for Modern Machine Tools equals Production Efficiency. It is the "formula for tomorrow" adopted by the National Machine Tool Builders' Association for The Machine Tool Exposition—1960, to be held at the International Amphitheatre in Chicago, September 6 through 16.



George P. Burns

NEW, AUTOMATIC RECESSING TOOL

answers the "chatter problem"

WITH RIGID, SINGLE-JOINT DESIGN

ELIMINATES TOOL DEFLECTION, ASSURES CLOSE TOLERANCES, FINE FINISHES

- 1 Solid, single-bar construction prevents cutters from chattering and keeps tool cutting accurately to depth, width and position. There is *only one joint* to effect tool accuracy... with a long supporting bearing surface.
- 2 End clearance is absolutely eliminated through the use of pre-loaded thrust bearings.
- 3 Uniform feed out is assured through precision-machined, double spiral feed cam and heavy duty feed pin.
- 4 Removeable ball bearing thrust plate will not damage work or bushing.

PRECISION ADJUSTMENT

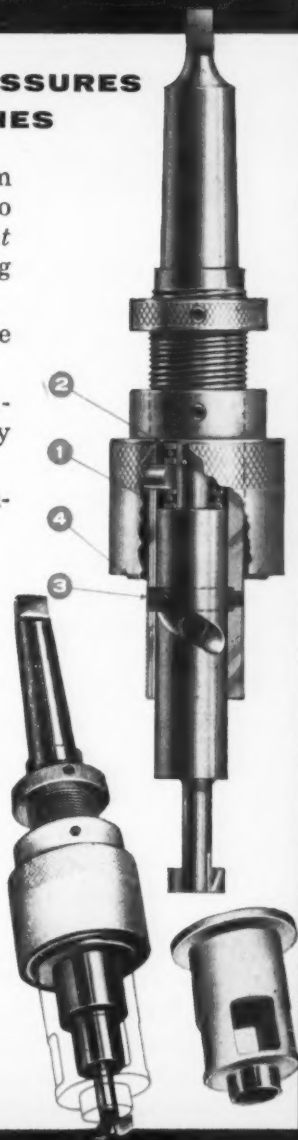
Depth and position of recess is adjusted through two calibrated adjustment nuts. Set up time is negligible. *Use Tool on Any Machine*... on any standard drill presses, milling machines, lathes, automatics, etc.

NEW, SNAP-ON ADAPTOR CONVERTS TOOL FOR PILOTING IN WORK!

The new Madison tool can pilot through a bushing in the work... or, by adding the adaptor, pilot in the work itself. The adaptor is used on work-turning machines such as lathes. Fixture bushings are normally employed on machines where the spindle is turning, as on drill presses.

Write for more information.

For more data circle 425 on Postpaid Card



MADISON *industries, inc.*
P. O. BOX 1137, PROVIDENCE, R. I.



Report from Washington

on Events Which May Affect You and Your Job

● **STEPS TO HELP DOMESTIC MACHINE-TOOL BUILDERS** will soon get under way in Washington. They'll be taken by the Office of Civil and Defense Mobilization at the request of domestic producers, who face increased imports and declining export markets. The program will start out with a survey to learn the extent of obsolescence in domestic metalworking plants. It will also ask why plants haven't taken advantage of the newer depreciation methods enacted recently. Three other steps are planned under the machine-tool program: Exports—The Commerce Department will study ways of increasing shipments abroad and whether foreign suppliers in the market here may be guilty of engaging in market manipulation practices. U. S. stockpile—The Budget Bureau will tell other agencies of the government how they can save by modernizing their holdings. Purchase loans—The Small Business Administration will draw up legislation for U. S.-guaranteed purchase loans for equipment modernization. However, Congress isn't likely to approve it.

● **SMALL COMPANIES INTERESTED IN ENTERING FOREIGN TRADE** will receive help from two U. S. agencies—the Small Business Administration and the Department of Commerce. SBA is planning meetings all over the country this year to tell businessmen about world commerce opportunities. The Commerce Department will assemble data from trade missions in many countries; SBA will distribute it.

● **THE PRODUCTIVITY OF U. S. FACTORY WORKERS IS RISING RAPIDLY** these days. For 1960 as a whole, the gains will be substantial, extending those of last year. (In 1959, despite the big strike, output per man-hour in manufacturing rose 7%—largely in the first half.) With wage rates moving up less rapidly than in past expansions, this indicates that

business probably can increase its profits this year—even though there'll be less pressure to raise prices. For production workers alone—excluding office, sales, and other help—government figures show productivity gains last year were less than those for all workers. Relatively few nonproduction workers have been added to work forces to handle the big output rise of the recovery. In durables, production worker output per man-hour rose $5\frac{1}{2}\%$; the increase was only 2% in the nondurables. The gains in productivity this year will be big, though probably not as great as in December and January, the catch-up period at the end of the steel strike. For 1960 as a whole, you may see gains of 6% or so. But a downturn in business activity later in the year could easily bring a much lower productivity rise.

- **LABOR'S NEWEST BARGAINING GOAL IS THE AGENCY SHOP**, which provides for payment of a "service charge," equivalent to union dues, by nonunion workers. The new steel contract, which set up an agency shop for the first time in that industry, has touched off the drive. Big advantages for the unions is that the agency shop is legal in some states where "right-to-work" laws bar union shops.

- **COLLECTION OF STATE TAXES ON INTERSTATE BUSINESS** is being stepped up by several states—and more are expected to launch collection drives later in 1960. (This is the tax the states are levying on apportioned shares of the profits a firm derives from business within a "foreign" state's borders.) A law by Congress exempted some—but far from all—types of business from this type of state taxation. Some businessmen are reportedly waiting till states bill them; however, this could mean added expenses in interest and in penalties. Georgia and Louisiana are especially active in collection drives. Nearly 30 states now have laws on the books for taxing interstate profits.

- **THE DEMOCRATS WILL GET HALF OF THEIR PROGRAM** through Congress this year. That's the view of political observers in assessing the chances for the program laid out recently by Senate Majority Leader Johnson and other party chieftains. The Democrats probably will be able to carry out their plan to cut \$2 billion or so from Ike's Budget, mainly in foreign aid. Johnson also will be able to push through a big housing bill, a hike in the minimum wage, bigger benefits to social security recipients, a civil rights plan, and more funds for space work. It is hard to see where the Democrats will get the strength they would need to pass their bills for

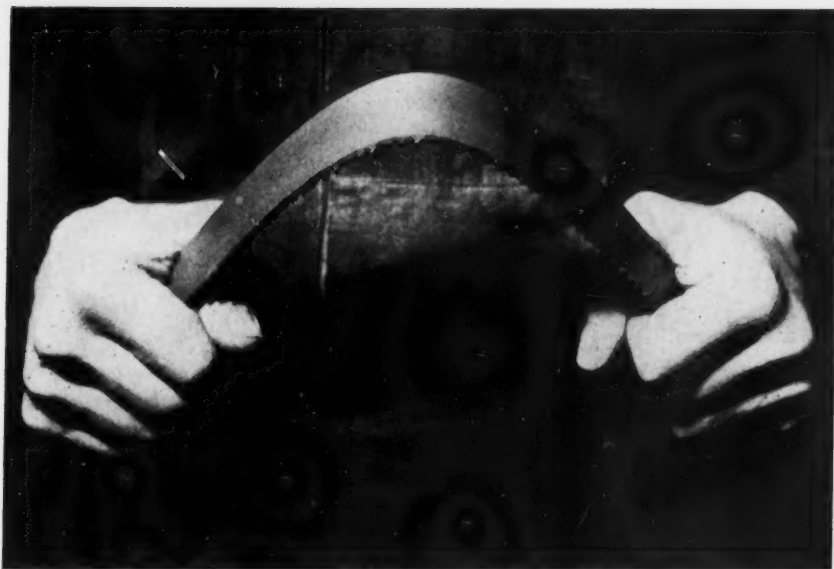
Report from Washington . . .

hospital care for the aged, a new farm program, aid to education, more money for public works, and more appropriations for the military.

● **ECONOMISTS ARE SOMEWHAT LESS OPTIMISTIC ABOUT BUSINESS** now than they were a few months ago. This doesn't mean that they are looking for serious trouble or an early recession. Quite the contrary—they still believe that business will expand and new records will be set. But they don't feel that gains will be as large as originally anticipated. Why? Two reasons: The January stock-market break has raised doubts about an early leveling out. And business has cut bank borrowing—which may mean less inventory buying. Behind these warning signs, the experts note these factors: Inventory rebuilding hasn't been as great as expected after the end of the steel strike. The strike didn't reduce them as much as was believed and they were high at the year-end. Sales of new cars are falling short of expectations, despite good Winter sales; stocks are piling up and production rates are being trimmed. So, near-record forecasts may not be met. All of this is vitally important, because inventory-buying and sales of autos were counted on heavily to lift business. Here is what analysts in government and industry now think:

Inventories, which were expected to rise in the first quarter at an annual rate of \$10 billion, now may rise only at a rate of \$8 billion or so. Next quarter, the rate may be cut more. Steel output looked as if it would hold at 90% through June until very recently. Now production may be cut much sooner. Auto sales had been expected to hit 7.2 million during 1960. But the talk in Detroit now is of 6.8 to 7.0 million units. But, this still would make 1960 one of the best years ever. Business spending for new plant and equipment may not show more than a 10% gain over 1959; 15% had been the forecast. For the economy as a whole, the experts now are anticipating rises only one-half to two-thirds as much as first predicted.

● **PLANS TO PROTECT U. S. MARKETS IN EUROPE ARE BEING** set in Washington. They call for prompt protests—and implied threats of retaliation—at the first sign of discrimination against our exports from the two new trading blocs. The Commerce Department has called on industry for suggestions.



THIS is No Ordinary Power Hack Saw Blade

This is the *unbreakable* MARVEL High-Speed-Edge Hack Saw Blade—the first bi-metal blade—invented, developed and introduced by MARVEL. This blade is a combination of two materials best suited to the requirements of an efficient hack saw blade . . . a narrow high speed steel cutting edge permanently welded to a tough, non-brittle alloy steel body. Each blade is triple tempered to assure long life and maximum toughness to the cutting edge.

With a MARVEL Blade, you can cut any material—from the free machining steels to the toughest alloys . . . fast, accurately and economically.

You can tension a MARVEL Blade from 200% to 300% tauter than any ordinary blade, permitting much higher speeds and heavier feeds without deflection or breakage.

Like all good things, attempted copies of the MARVEL Blade have been numerous, but its performance has been *unequalled* by any of the imitators. Ask for MARVEL Blades by name and you can be sure you're getting the best on the market. Leading Industrial Distributors have them in stock.

Write for latest cutting tool Bulletin and the name of your nearest MARVEL Distributor.

FB-1020



ARMSTRONG-BLUM MFG. CO. 5700 W. Bloomingdale Ave., CHICAGO 39, U.S.A.

For more data circle 426 on Postpaid Card

WHAT TOOL ENGINEERS SHOULD KNOW ABOUT

Recent Developments in Tool Materials and Processes

Discussed are typical applications of ceramic and carbide tooling, electrical discharge machining, electrolytic grinding, ultrasonic machining and chemical milling.

By NORMAN ZLATIN

Vice President, Metcut Research Associates, Inc.

In recent years a number of new tool materials and metal removal processes have been developed to not only increase productivity but to supplement the conventional machining operations. The new tools have permitted increased cutting speeds while the special metal removal processes are being used to make parts that cannot be made by conventional machining methods. These developments make possible the production of unique shapes in a variety of materials, even in unmachinable materials. The tool engineer should be well acquainted with these new tools and processes.

New Tool Materials

The ceramic tool is a radically new tool that has recently been made available to industry. The material in this tool is aluminum oxide, a material which is commonly used in

grinding wheels. The tool has many outstanding properties. It has very high resistance to oxidation even at elevated temperatures. It is quite hard and has high wear resistance. With these properties, the ceramic tool is particularly good for turning at high cutting speeds. However, the tool is also very brittle and hence, as with any new tool material, new techniques have to be developed before it can be used with maximum success. The ceramic tool is furnished in the form of a throw-away insert to be used with a clamp type toolholder. Because of its brittleness it is particularly important that the clamping forces be distributed uniformly over the tool insert. Unless this is done the tool insert will crack upon clamping or during machining.

Another important factor to consider in using the ceramic tool is chip control. The chip must not be allow-

ed to wind about the cutting tool or the ceramic insert may be chipped. It is, therefore, necessary that a chip breaker be used. A satisfactory chip breaker can be made of a piece of carbide ground with a 45-degree chamfer and placed between the clamp and the ceramic insert. At feeds of about 0.010 inch per revolution, it is recommended that the chamfered edge be placed about 0.040 inch back of the cutting edge. The tool angles are not particularly critical. For most turning operations the following tool angles are recommended: back rake, 7-degree negative; side rake, 7-degree negative; side cutting edge angle, 15 degrees; end cutting edge angle, 15 degrees; relief, 7 degrees; and nose radius, 0.03 inch. Positive break angles may be used for light feeds under 0.005 inch per revolution.

The toolholders normally used for throw-away carbide blanks provide these angles and work quite well with ceramic inserts. Ceramic tools must be ground with diamond wheels using a coolant. The grinding procedure is quite similar to that used on carbide tools. Unless coolants are used there is a tendency to load the wheel.

An example of the performance characteristics of the ceramic tool is presented in Fig. 1. In this figure a ceramic tool has been compared with a C-6 and a C-8 grade of carbide. The material was an annealed AISI 1045 with a hardness of 170 BHN. A comparison between the ceramic and the C-8 carbide shows that the cutting speed with the ceramic tool is approximately 33 1/3 percent faster than with C-8 carbide. The advantage of the ceramic tool over C-6 grade of carbide is even greater. Since the ceramic tools are very

The Author



NORMAN ZLATIN graduated from the University of Cincinnati in 1937 with a degree in Electrical Engineering, and in 1942 with a B.S. in Mechanical Engineering. He is registered as a professional engineer in Ohio. Mr. Zlatin is a Vice President with Metcut Research Associates in Cincinnati, Ohio. He was one of the founders of the company, which has been actively engaged in metal cutting and metallurgical research for the past 10 years. Previous to his association with Metcut, he spent eight years in the Research Department of the Cincinnati Milling Machine Company, where he worked on basic machining problems. Mr. Zlatin is a member of the Cincinnati Chapter of the American Society for Metals and has written many papers on the subject of metal cutting.

hard, they are particularly advantageous in finish machining hardened steels. For example, the tool life in machining an AISI 4340 steel, quenched and tempered to a hardness of 400 BHN, was 18 minutes with a C-8 grade of carbide at a cutting speed of 400 feet per minute, a feed

Tool Materials . . .

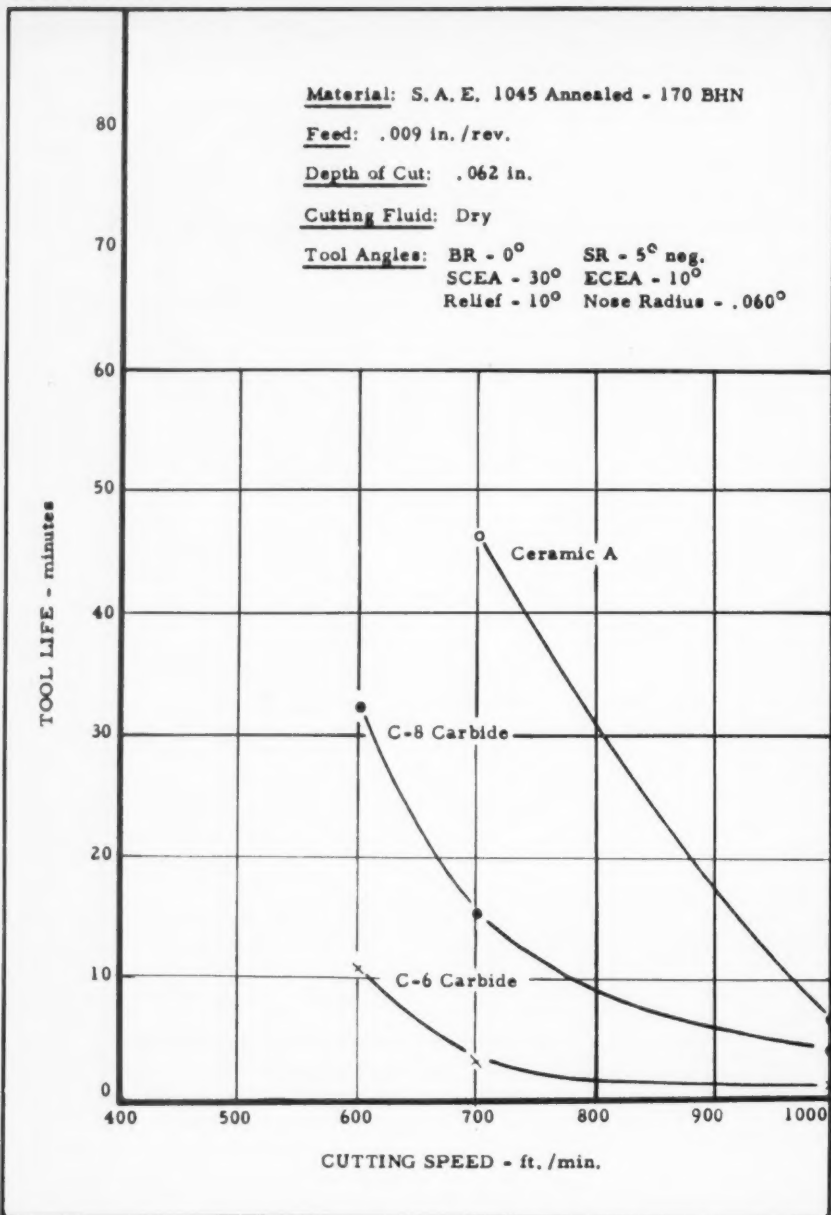


Fig. 1—In this chart, a ceramic tool is compared with a C-6 and a C-8 carbide tool.

of 0.009 inch per revolution, and a depth of cut of 0.030 inch. Under the same cutting conditions, the tool life was 39 minutes with a ceramic tool.

Another carbide tool that has been recently developed and is now available consists of titanium carbide with molybdenum carbide additions and a nickel binder. It appears that this tool is particularly good for higher speeds than normally used with the tungsten carbide base tools. Its primary advantage lies in finishing operations. It has some of the advantages of the ceramic tool but is not quite as brittle.

Several special methods of metal removal are being used which have considerable potential in supplementing machining operations with conventional tools on difficult-to-machine materials or in the production of complex shapes.

These special processes include electrical discharge, electrolytic, ultrasonic and chemical milling methods. The electrical discharge, electrolytic and ultrasonic methods can be used to produce parts with intricate shapes even in extremely hard metals, such as sintered carbide. The ultrasonic method, in addition,

can be used on non-metallic parts. The chemical milling process is being used quite extensively in the aircraft industry on large parts made of aluminum and magnesium alloys.

Electrical Discharge Method

In the electrical discharge process, the machining operation consists of sending a series of electrical discharges occurring at a rate of 20,000 to 300,000 per second between an electrode (tool) and the workpiece. Both the electrode and workpiece are submerged in an oil. Each spark discharge vaporizes a tiny portion of the workpiece.

The cavity formed is a duplicate of the shape of the electrode. The sparking occurs in both directions between the electrode and the workpiece and hence, erosion of the electrode also occurs. The rate of this erosion depends on such factors as electrode material, workpiece and rate of metal removal.

In drilling steel the ratio of electrode wear to metal removal from the workpiece is about one to one. In the case where the workpiece is a cemented carbide, the rate of electrode wear is three times as great.

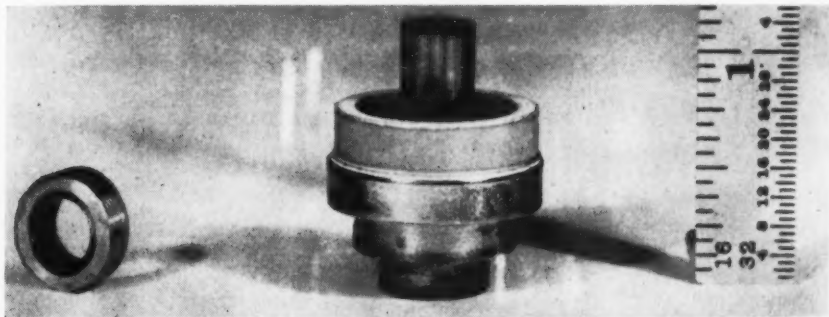


Fig. 2—Example of operation in which electrical discharge machining was most advantageous.

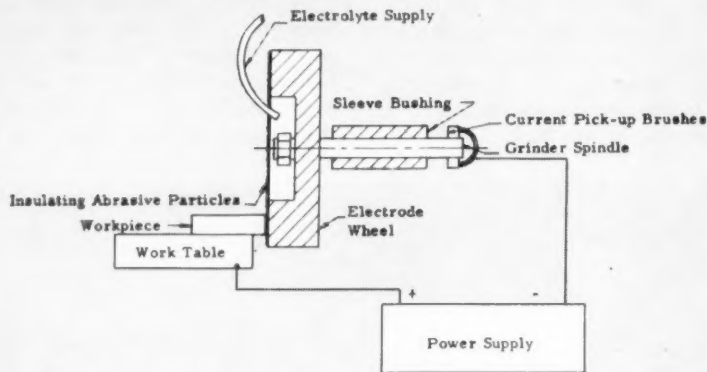
Tool Materials . . .

The surface finish obtained by the electrical discharge method is principally a function of the rate of metal removal. In a roughing operation on steel where the metal removal rates of 0.003 to 0.01 cubic inch per minute are obtained, a surface finish of 150 microinches can be expected. In a finishing operation the metal removal rate is approximately 0.001 cubic inch per minute and a surface finish of 30 microinches is produced.

The electrical discharge process has many distinct advantages in applications where unique configurations are required and the metal removal rate is of secondary importance. It also has its advantage in the "machining" of unmachinable materials such as sintered tungsten

carbide. An example of an operation in which electrical discharge method was most advantageous is shown in Fig. 2. The operation here was one of machining simultaneously 72 accurately spaced slots around the periphery of a pair of concentric cylinders. The thickness of each cylindrical wall was 0.010 inch and the slots were 0.008 inch wide and 0.250 inch long. The stock between each slot was 0.007 inch. The total machining time was ten minutes. The electrode used in producing the slots is shown in the left side of the figure. It was made of brass and was precision broached to shape.

The spark discharge method can compete with conventional machining methods quite favorably in such operations where a multiplicity of holes is required in thin sheet metal.



Either the grinding wheel and spindle or the workpiece must be insulated from the bed of the grinder

Fig. 3—Diagram of basic setup for electrolytic grinding. Wheel serves as one electrode.

For example, a brush-like electrode consisting of 1,000 brass needles was used in producing 1,000 holes 0.020 inch in diameter in one operation through a stainless steel sheet.

Electrolytic Method

The electrolytic method is in effect a deplating process. Heavy direct currents are passed from the electrode to the workpiece. The metal is removed from the workpiece by electrochemical action and goes into solution as metallic salts. Figure 3 shows the basic setup for electrolytic grinding. A rotating wheel made of brass with hard insulated particles (usually diamonds) in its grinding surface serves as one electrode. These hard particles remove any coating that might form on the surface of the workpiece, however, their prime purpose is to prevent metal contact or a short circuit between the wheel and the workpiece. The operation is quite similar to conventional grinding. Figure 4 shows an example of the use of electrolytic grinding in the production of chip breakers in carbide tools. In this case, a groove $\frac{1}{2} \times \frac{1}{8} \times 0.020$ inch was ground in a C-6 grade of carbide in ten seconds.

A further advancement in electrolytic machining has taken place recently in which the electrode does not rotate. In this case the electrode advances into the workpiece. Using very heavy currents, the electrode can advance linearly at a rate up to 0.3 inch per minute. A dimensional accuracy of 0.001 to 0.002 inch can be expected. Surface finishes of 10 to 100 microinches are obtained.

Ultrasonic Machining

In the ultrasonic machining process, cutting is done by abrasive grains

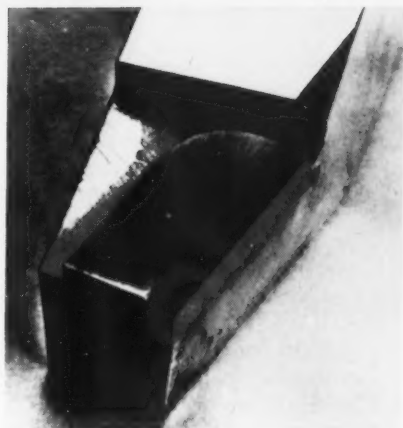


Fig. 4—Illustration shows an example of the use of electrolytic grinding in the production of chip breakers in carbide tools.

which are repeatedly driven into the workpiece by the linear oscillations of the tool. The heart of the ultrasonic process is the transducer. This unit converts electrical energy into mechanical energy and then transfers this energy to the tool in the form of linear oscillatory motion. This action is developed through a phenomenon known as magnetostriction. A diagrammatic sketch of the transducer is shown in Fig. 5. The tool oscillates at about 20,000 cycles per second. A steady stream of a liquid containing the abrasive particles is pumped between the oscillating tool and the workpiece. The shape of the tool determines the configuration of the cavity produced. A tool stroke of a few thousandths of an inch is generally used. The grit may be either boron carbide, silicon carbide or aluminum oxide. A coarse grade, 200 to 400 mesh, is used for roughing. A finer grade up to 1000 mesh is used in finishing. A finish of 25 microinches is obtained in roughing and 10

Tool Materials . . .

microinches is obtained in finishing.

One of the principal advantages in the use of the ultrasonic process is that it can be used on non-metallics. Such materials as germanium, sapphire, quartz, glass, silicon materials and other ceramic materials are readily machined by this process. The harder the material, the faster the cutting action. The ratio of tool wear to work is one to one for the machining of tungsten carbide with the stainless steel tool, and is one to 100 with the same tool on such materials as semi-conductors, ceramics and glass.

The ultrasonic process is used rather extensively in the production

of crystals for transistor components and jewel bearing blanks.

Chemical Milling

Chemical milling is a process of shaping a piece of metal by dissolving off the excess material in an appropriate solution while protecting the remaining surfaces with an effective mask. There are four main steps in the chemical milling process; namely, cleaning, masking, etching and stripping. At the present time the bulk of the parts that are chemical milled are aluminum. Steels and other alloys are being chemical milled successfully on an experimental basis.

The chemical milling process is used primarily for the production of: (1) shallow cavities or pockets, (2)

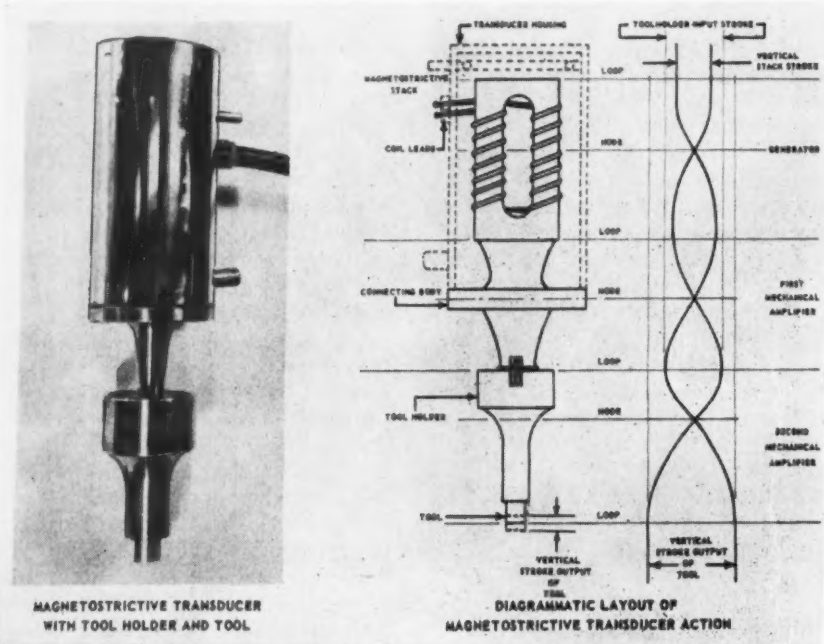


Fig. 5—The magnetostrictive transducer, the heart of the ultrasonic machining process.

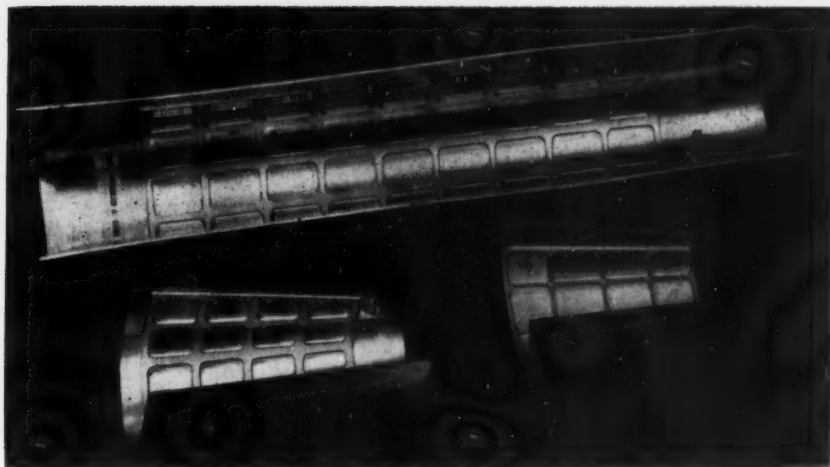


Fig. 6—The versatility of the chemical milling process is illustrated by these parts.

tapered sections, and (3) overall weight reduction. Its application is particularly advantageous on sections that are not readily accessible and for large areas on thin sections that cannot be clamped for conventional machining. Chemical milling provides a relatively simple method of metal removal on parts having complex curvatures or thin web sections. With this method a part can be contoured after it has been formed. The versatility of the chemical milling process is illustrated in Fig. 6. The pockets were etched on the convex side of a curved titanium sheet.

Another use for chemical milling is the production of tapered sections. A tapered section is obtained by submerging the entire part in an etchant bath and then withdrawing the part at a predetermined rate. An overall weight reduction in the part is obtained by etching the part without a maskant. Usually the temperature and concentration of the etchant are set so that a rate of metal of 0.001

inch per minute in depth is obtained. Even though this rate may seem to be very slow the total rate of metal removal is reasonable since very large areas can be etched or both sides of the part can be etched at one time.

The dimensional tolerances in depth of etch is a function of the number of times the part is removed and checked. A tolerance of 0.002 inch is practical. One of the important limitations of this process is the maximum recommended depth of cut is $\frac{1}{2}$ inch. This limitation is suggested since the surface finish gets progressively poor as the depth increases. Also, a fillet equal in radius to the depth develops. In addition, it is difficult to control the etching action in the deeper pockets since the fluid cannot circulate freely.

Considerable research is being conducted to further develop these processes and tools. It behooves the tool engineers to follow these developments very closely and to make use of them as the need arises.

A MONTHLY DISCUSSION ON



How to Solve Your Supervisory Problems

Do not curtail supervisor's authority to run his department.

By ALFRED M. COOPER

Contributing Editor, Modern Machine Shop

A supervisor recently wrote me, asking a number of pertinent questions relating to his job. One of these was, "Just where do a foreman's responsibilities end? You have stated that just about everything that happens in the supervisor's department reacts either to his credit or discredit. But aren't there instances in which influences beyond the supervisor's control can affect the actions of *either the worker or the supervisor's boss?*"

This foreman has a point. In all my books I have hammered on the necessity that every supervisor must have complete authority to run his job. I have reiterated that only then can the foreman's superior hold him absolutely and solely responsible for his efficiency in getting out production, maintaining good morale among his subordinates, and keeping them physically fit.

I think nowadays' nearly all executives subscribe to this credo, both in theory and practice. Only occasionally do we encounter a worried divi-

sion chief who refuses to delegate sufficient authority to his department heads. Where a superior exists who refuses to relinquish the reins to his lieutenants, obviously most of the credit (and unfortunately most of the blame) for good or poor employee performance must rest on the shoulders of the superior.

So here is one limitation of responsibility (at the top) that may apply in the case of any foreman or office manager. My experience and observation leads me to believe that this situation is not at all common today—not nearly so common as it was 25 years ago. Administrative duties have become so complex that the top-flight executive of today rarely short-circuits the immediate boss of the work force. If he did he would not have time to take care of his real job—which is administration.

At the lower strata of the supervisory spectrum there is another and far more serious restriction on the ability of the foreman to function. This manifests itself when some

For answers to your perplexing managerial problems address your letters to:
Mr. Alfred M. Cooper, MODERN MACHINE SHOP, 431 Main St., Cincinnati 2, Ohio.

power beyond his control urges one or more of his subordinates to slow down in production. Indeed, the worker himself is in a spot here; his loyalty to the company, to his supervisor, *and even to his country*, may be placed in direct opposition to forces acting on him from those who are not his supervisors.

I have found this situation most common among our several million governmental workers. Yet there can be no doubt that this setup is becoming increasingly common within private industry. And, of course, where it exists it is just too bad—for the foreman, for the company, and for the United States of America.

Such interference can take one or more of a number of forms, and every one of these is deplorable. Sometimes personnel management will become honestly convinced that in these "enlightened days of national industrial prosperity" it is a mistake to permit the foreman to bear down very hard on any worker, and may interfere sharply with any supervisor who attempts to get a fair day's production out of each of his subordinates. Since 1940 there have been a score of "advancements" in personnel practice, many of which have withdrawn a little more authority from the foreman. When we remember that it was in 1940 that individual worker output dropped off 40 percent throughout our industries, and never since has regained the norm for 1939, it is pertinent to look for a correlation here.

Slow-down practices originated in federal and state governmental bureaus, but later fanned out into much of industry. This is the old, old business of pampering workers in boom periods, and attempting to win

their fullest cooperation by encouraging them to take it easy.

Other agencies also work overtime pressuring the foreman to indulge in an unpleasant type of "soft supervision." Sometimes the effort stems from political necessity; sometimes it results from far more sinister maneuvering.

None of this interference with a foreman's legitimate authority would be permitted to exist for a single moment if it was thoroughly appreciated by all concerned that unless we can get maximum production from the individual worker with no injury to his person or morale, prosperity, full employment, and our world industrial supremacy may suddenly become a thing of the past. Many authorities say we have already reached and passed that point.

Once a good supervisor has been selected it is up to everyone connected in any way with industry to see to it that his authority to run his department is in no degree curtailed.



Japanese Firm Uses American Tooling in . . .

Hobbing Automotive

Three different splines are cut in each shaft by means of eight-spindle vertical production hobbing machine.

By G. BRUCE COLLINS

An eight-spindle vertical production hobbing machine manufactured by The Lees-Bradner Company, Cleveland, Ohio, is now in operation at a Japanese automotive firm producing transmission shafts. The machine cuts three different splines in a 21-inch shaft that is forged of cold-rolled steel. Rockwell C hardness is 23-34. The machine is used to add to and balance out production of other hobbing machines in the plant. For all three splines, hobs 3 inches in diameter and 4 inches long are used. They rotate at 250 revolutions per minute.

Spline No. 1 (see Fig. 1) has 10 teeth and a pitch diameter of 1.0000 inch. It is cut on spindles No. 1 and 6 (see Fig. 2). The machine cuts 48 splines per hour at 80 percent

efficiency (24 splines per spindle).

Spline No. 2 (Fig. 1) is cut on spindles 2, 3, and 7 (Fig. 2). This spline has 15 teeth, a pitch diameter of 1.5282 inches and a helix angle of 11.032 degrees (left hand). The three spindles cut a total of 36 splines per hour at 80 percent efficiency.

Spline No. 3 (Fig. 1) is cut on spindles 4, 5, and 8 (Fig. 2). It has 10 teeth, and a pitch diameter of 1.0000 inch. The three spindles produce 36 splines per hour at 80 percent efficiency.

The Tooling Setup

A steady rest is used in each of the three hobbing operations. The three splines can be cut in any order. When hobbing the splines on each end (splines 1 and 3), the work is held



Fig. 1—Three splines are hobbled in this transmission shaft. Spline 1 is a straight spline, has 10 teeth and a pressure angle of 30 degrees. Spline 2 with 15 teeth is

cut at a left-hand helix angle of 11.032 degrees and a pressure angle of 30 degrees. Spline 3 is also a straight spline, has 10 teeth and a pressure angle of 30 degrees.

Transmission Shafts

between a center and a Lees-Bradner point driver (see Fig. 3). In loading, the transmission shaft is placed against a rough locator, and the lower end is set on the spring-loaded center of the driver. As the hydraulic tailstock closes, it picks the shaft off the rough locator and centers the work between its center and the center in the driver. As the tailstock closes, the head center is forced back until the knife edges of the driver bite into the end of the shaft. This "grip" provides the drive needed to rotate

the work during the hobbing operation. Positive drive is needed because hob heads are set at an angle and thus create a turning force on the workpiece. In addition, tooth-thickness tolerances are held within close limits.

When the helical spline (No. 2) is hobbed, the work is held between the tailstock center and a special Model R Erickson Tool Company collet chuck (see Figs. 4 and 5). This chuck provides the greater holding power needed for the high torque

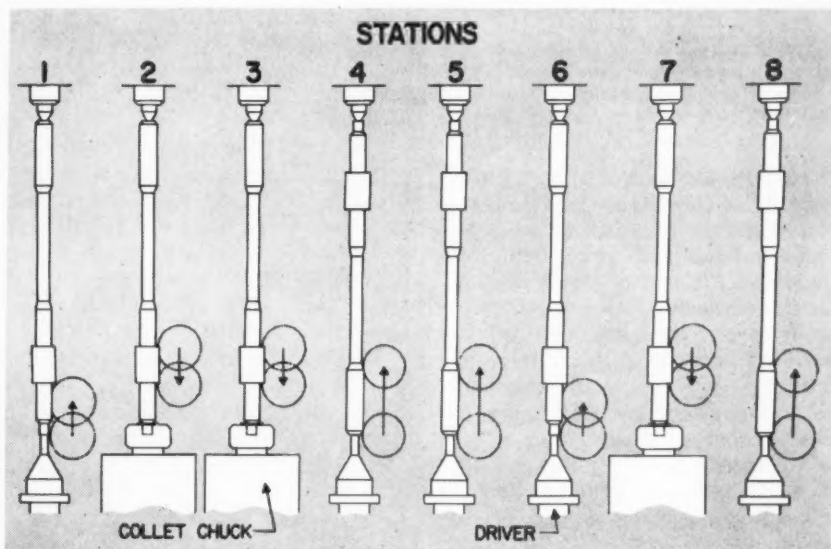


Fig. 2—Tooling stations of eight-spindle rotary hobber are shown here. Spline 1 is cut on spindles 1 and 6. Spline 2 is cut on spindles 2, 3, and 7. Spline 3 is cut on

spindles 4, 5, and 8. Erickson collet chucks are used on spindles 2, 3, and 7; Lees-Bradner point drivers are used on the other spindles. Splines can be cut in any order.

"All movements of the hobber are controlled electrically."

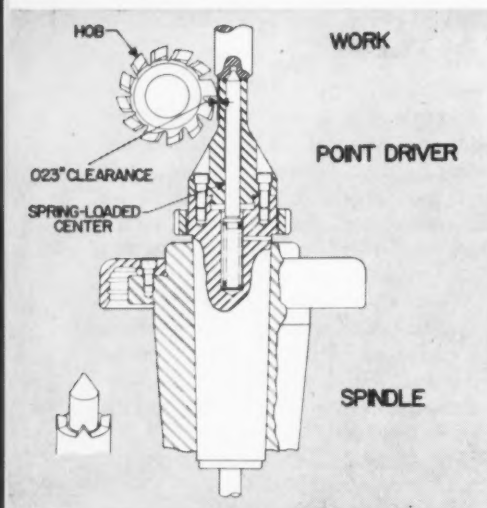


Fig. 3—Cross-sectional drawing showing design of Lees-Bradner point driver, which enables splines to be hobbled in the work right down to the nose of the work spindle.

created by the helical spline, multiplied as it is because the spline is cut on a diameter larger than that of the portion of the shaft being held. The chuck is air operated. Its air cylinder uses the mechanical advantage of levers to give three to four times the force ordinarily obtained. The piston is of a "donut" design and surrounds the collet itself, permitting an extremely compact unit.

The collet used is ground to a gage fit on its camming surfaces. Because a gage fit wears to a gage fit, the collet retains new-collet accuracy. The collet is cut into a large number of segments, alternately from both ends. This provides balanced pressure on the part being held—both

end to end and around the circumference of the work.

The surface between the nose ring of the chuck and the lock nut is spherical so that inaccuracies inherent in the thread of the lock nut do not affect the concentricity of the collet. Because of the construction of the chuck, concentricity at the nose of the collet is guaranteed to be within 0.0005 inch TIR (total indicator reading). Concentricity is assured by accurate grinding of the outside diameter of the chuck shank and its two cam surfaces that force the collet to close. The cam surfaces of the collet itself and its inside surface which holds the part are also ground with extreme precision.

An end cap surrounds the collet nose to keep out coolant and chips. What coolant does enter is taken away by three drain holes in the center of the chuck.

The Lees-Bradner machine is set up to climb hob in this instance. Because of the complexity of the machine, tolerances of 1 to 2 ten-thousandths must be held on ways, bearings, and drive gear tooth spacings. The hobber itself can hold dimensions to 0.0006 inch.

The hob in-out mechanism brings the hob automatically into full depth at the start of the hobbing cycle. On completion of the cut, it backs out of the cut before returning to rest. Thus, it is not necessary to drag the hob back through the cut during the quick return and risk dulling the hob or marring the work.

All movements of the hobber are controlled electrically. All production operations are initiated by a push

"... the machine is able to shift hobs $3\frac{1}{2}$ inches ..."

button. However, manual control of the cycle is provided to speed up changing jobs, and greatly simplifies changing hobs, spotting, and setting for proper depth of cut.

To reduce the number of tool changes needed, the machine is able to shift hobs a total of $3\frac{1}{2}$ inches to spread the wear over the entire hob. The hob is shifted quickly during the unloading of the part. The frequency with which a hob should be shifted depends on the hardness of the material, number of teeth, face width of the blank being hobbled, hob sharpness and many other factors. The hobber is equipped with an electric counter that is preset for the

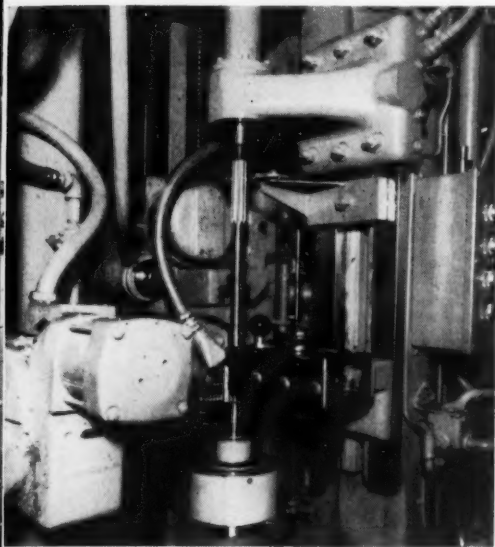


Fig. 4—Climb hobbing of the helical spline creates high torque. A special collet chuck of high holding power and compact design is used to drive the transmission shaft.

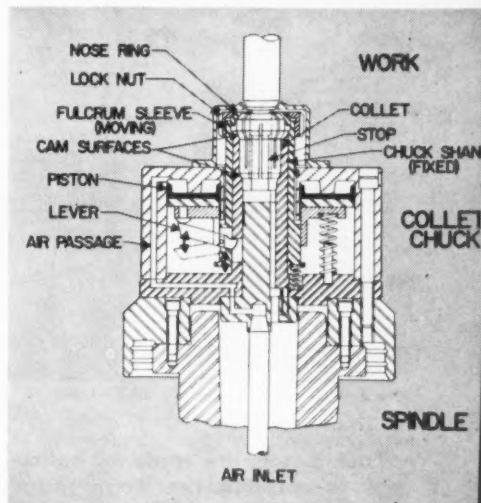


Fig. 5—Cross-sectional drawing of Erickson collet chuck which is designed to assure concentricity within 0.0005 inch TIR (total indicator reading) at the nose of collet.

number of cycles that can be made before the hob needs to be shifted. When this number of cycles has been run, a green light signals operator to push a button that will shift the hob.

By checking the hob, the operator can make additional savings in tool costs. If he sees a dull tooth or excessive wear on any section of the hob, he merely shifts the hob several times so that the unusable section of the hob is out of the cutting zone and he then continues cutting with the usable part of the hob. By using the hob shifter, a hob section that might be severely damaged by continued use is merely shifted out of the way to be corrected when the hob is later removed for sharpening purposes.

How to Improve Your Plant Lubrication System

Author discusses lubrication practices which are somewhat unusual yet which can be incorporated in plant lubrication systems already in operation.

By M. L. KLAIBER

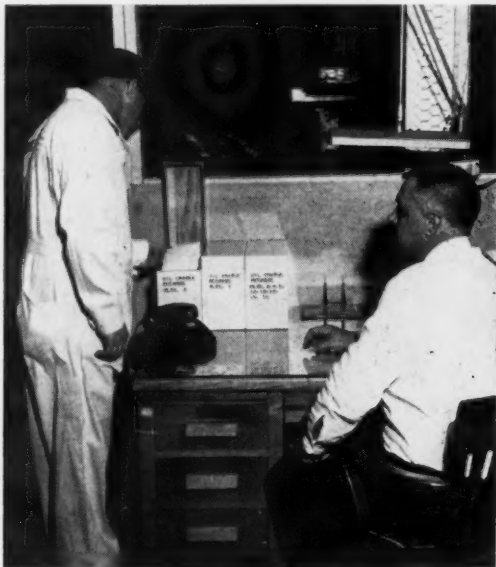
Assistant Foreman, Mechanical Maintenance,
Long Beach Division, Douglas Aircraft Company

Each day in the some 50 buildings comprising the huge plant of the Long Beach, California Division of Douglas Aircraft Company, where the huge new DC-8 jet airliners are being produced, approximately 3500 major machines must be properly inspected and lubricated. This is no small task, either as to effort or costs. But as any experienced plant engineer will readily admit, both the dollars and time spent in effective machine lubrication purchase the ultimate in preventive maintenance.

This article is not intended to blueprint the system we use to control plant lubrication, nor to insist that our techniques are superior. However, we observe certain practices which have proved very effective, so we will describe them with the fervent hope that others may benefit from our experiences. In most cases, and with a minor amount of effort and change, these practices, where applicable, could be incor-

porated in plant lubrication control systems already in operation.

One practice we observe at the Long Beach Division of Douglas Aircraft Company, and a practice which has proved successful, econom-



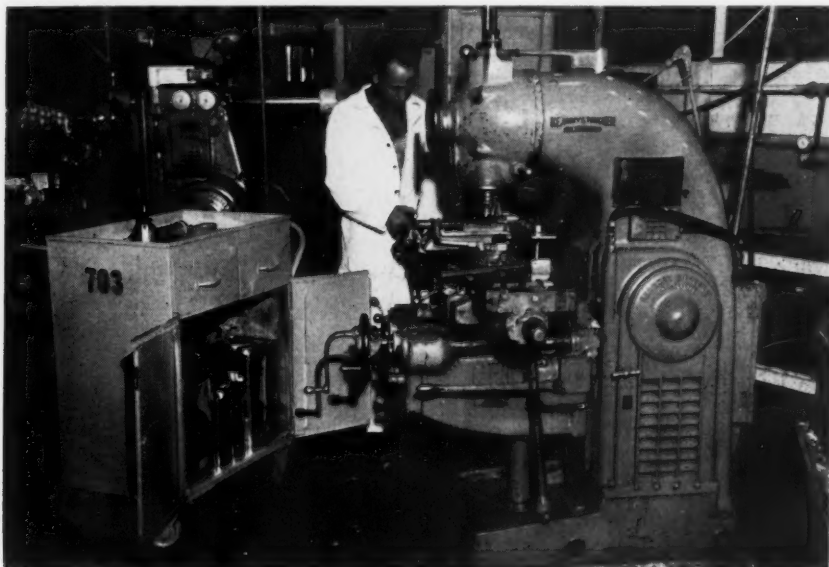
Oiler pulls cards which list reservoir oil changes to be made on a specific day from "round robin" card file on foreman's desk.

ical, and extremely practical, is use of a portable filtering system for filtering and renewing the hydraulic oil supply in our many large hydraulically operated machines. This portable filter consists of two twin-filter packs containing Fuller's Earth, a substance employed in original oil refining, and a heating element for heating the oil being filtered. Purpose of the heater is to expel any moisture that may have accumulated in the oil supply.

In use, this portable filter is moved to the machine to be serviced and a filter intake connection is made to a fitting on the bottom of the hydraulic oil reservoir. Discharge from the filter is lead to the fill spout on the reservoir. Combined action of the four filters and the heat to dissipate all



With intake and discharge hoses attached to the machine's hydraulic oil reservoir, oiler snaps switch on the portable filter used to re-refine the hydraulic oils in use.



In this illustration, an oiler, together with his supply cart, is shown in the process of servicing a Kearney and Trecker milling

machine in the Douglas Aircraft Long Beach plant. The cart contains all of the oil supplies required on daily routine rounds.

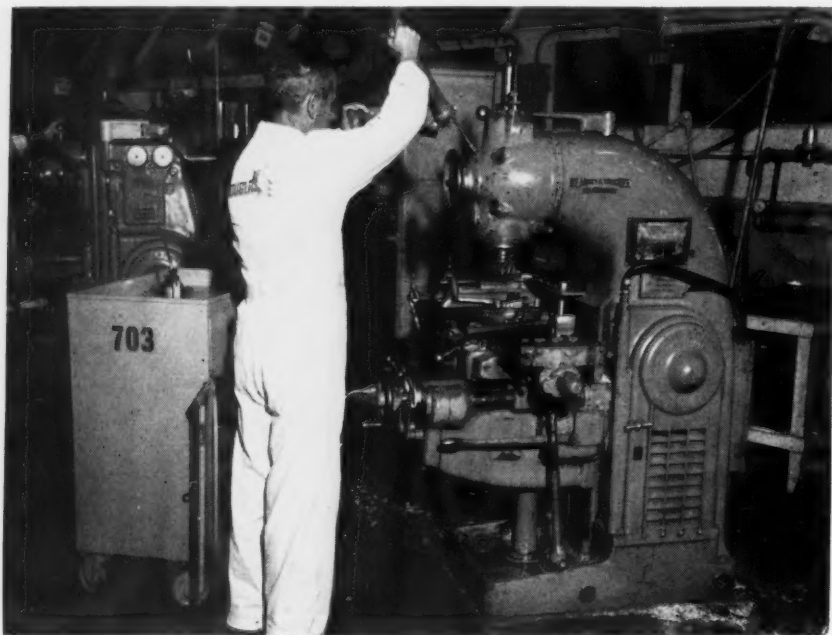
"All machines with hydraulic oil reservoirs are inspected daily."

moisture returns the oil to its original specification quality. There is no limitation on the number of times the oil supply in any one machine may be filtered and renewed. If at any time a doubt occurs concerning the condition of the oil after filtering, a gallon sample is sent to the supplier's refinery for complete analysis, and the results of this analysis are used to determine whether or not the oil in that particular reservoir should be changed.

This oil filtering operation does not interfere with the machine being serviced, and it continues to operate.

Thus, production time is saved along with the cost of frequent reservoir oil supply replacement. We limit the use of this portable filtering system to machines with at least a 50-gallon hydraulic oil reservoir. When all costs are considered, it is more economical to replace the oil supply in smaller reservoirs.

All machines with hydraulic oil reservoirs are inspected daily as a precaution against accidental oil loss. Changes of oil on the smaller machines where the supply is not filtered are controlled by a round-robin card system in the main crib. Each day,



To avoid the possibility of over-lubrication of machines in the plant, all pressure gun greasing required on machines is accom-

plished by oilers on the day shift. This arrangement effectively avoids duplication of the greasing job on other shifts of oilers.

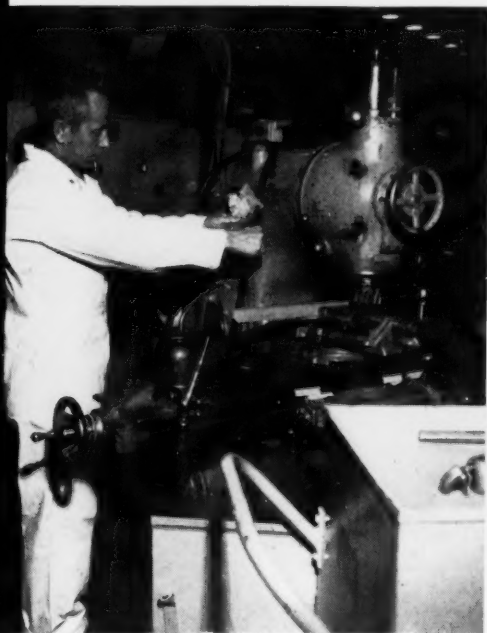
"... individual employee responsibility is a very important factor."

the cards selected from the front of this file list the machines on which oil changes are necessary. After the changes are made, the cards are returned to the rear of the file and then gradually work forward day-by-day until they reach the front of the file again. The eight-hour workday shift of each oiler is scheduled so that he can accomplish all of his squirt-can and pressure gun greasing in six hours. This leaves him two hours each day for hydraulic oil reservoir inspections and replacements.

We at Douglas are firmly convinced that regardless of the plant lubri-

cation system and controls employed, individual employee responsibility is a very important factor. For this reason, we try to employ older men with a comprehensive mechanical background to accomplish the work. The mechanical background can vary from that of a master mechanic to that of a good automobile mechanic—just so long as the man is aware of the importance of proper lubrication and the part it can play in machine life and efficiency.

In addition to their routine work, our oilers are charged with the responsibility of cursory inspection



An oiling job finished, an oiler punches machine's perpetual calendar-type maintenance oil record card with his coded punch.



Each plant area oil crib is kept locked, with only oilers carrying keys. Each crib has its own chain hoist for stock handling.

"... controls make sure that each machine is properly lubricated."

work on each machine they service, especially where lubrication is affected. Undue lubrication requirements and what is causing same are more easily noted by the oiler than by the machine operator himself. Any troubles discovered in this manner are reported immediately so that proper action can be taken.

The controls we employ to make sure that each machine is properly lubricated are few but quite comprehensive in results. Each machine mounts its own lubrication chart, showing where it must be lubricated, how often, and the types of lubricants to use. In addition, all machines mount a record card of the everlasting

calendar type. Each oiler carries a punch with his own special code, and each time the machine is serviced, he punches this card to indicate the date. With the thought in mind that quite often over-lubrication is as harmful as under-lubrication, all pressure gun greasing is limited to day-shift personnel. Thus, there is no duplication in pressure gun greasing during other shifts. Squirt-can oiling is, of course, carried on during each shift.

Over the years, we have managed to greatly simplify our oil and grease inventories. Today, despite the number of machines being serviced, we stock only six basic oils, two gear

RICHFIELD OIL CORPORATION		
RECOMMENDED LUBRICANTS FOR Dept. 703 Bldg. #14		
Machine Make & Model Sidney Lathes Ser. 6893 Equipment # GEPT 54		
UNIT	LUBRICANT APPLICATION METHOD OR CONDITION	RICHFIELD RECOMMENDS
General Lube	Hand Applied Daily	Eagle Oil 700-4
Gear Box	Reservoir Daily	Eagle Oil 700-3
Headstock	Reservoir Daily	Eagle Oil 700-3
Apron	Reservoir Daily	Eagle Oil 700-3

Each machine mounts a permanent lubrication instruction chart showing where the machine must be lubricated, the types of lubricants to use, and the frequency of lubrication.

"... each oiler is acquainted with the stock in the crib."

oils, and three pressure gun greases—eleven basics in all. Of course, there are certain specialty oils and greases which must be stocked, but by careful substitution we keep these particular products within a reasonable limit.

Because certain lubricants may be harmful when wrongfully used, we in maintenance work insist upon complete control over all plant lubrication jobs. Incoming oil and grease supplies are received and then metered out to various cribs as required. The cribs are kept locked at all times with only the oilers having admittance keys. Even when an oil or grease is delivered to a crib, it is dropped outside where, at the same

time, the delivery vehicle picks up any empty drums or cans from the disposal area. Each crib is provided with a chain hoist for handling the stocks into and out of the crib area. Thus, because of intimate handling, each oiler is acquainted with the stock in the crib, where it is located, and the condition of the supply.

As in many plants, each of our oilers is provided with his own supply cart which moves with him on his daily rounds. After a very short time on the job, or working in a specific area, the oiler becomes intimately acquainted with the types and amounts of each lubricant he will need, and can supply his cart from crib stocks before he starts his round.

JAN.							FEB.							MAR.							APR.							MAY						
1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21
22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28
29	30	31					29	30	31					29	30	31					29	30	31					29	30	31				

JUNE							FORM 70-172 TAG (3-56)	JULY						
1	2	3	4	5	6	7	MAINTENANCE OIL RECORD SIDNEY LATHE Equipment No. <u>Ser. 6893</u> <u>9EPF 54</u> Dept. <u>703</u> <u>Bldg. 14</u> YEAR <u>1960</u>	1	2	3	4	5	6	7
8	9	10	11	12	13	14		8	9	10	11	12	13	14
15	16	17	18	19	20	21		15	16	17	18	19	20	21
22	23	24	25	26	27	28		22	23	24	25	26	27	28
29	30	31						29	30	31				

AUG.							SEP.							OCT.							NOV.							DEC.						
1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21
22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28
29	30	31					29	30	31					29	30	31					29	30	31					29	30	31				

Each machine carries its own maintenance oil record card of this permanent calendar type. Oilers punch card with coded punch (see upper left) each time the machine is serviced.

Plant Lubrication . . .

FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.
LUBRICATION CHANGE RECORD										
MACHINE NAME <u>Sidney lathe</u>										
SIZE <u>24 in.</u> MODEL <u>Ser. 6893</u>										
LOCATION <u>Dept. 703 Bldg. 14</u> NO. <u>9875 54</u>										
DATE	TYPE OF LUBE	UNITS SERVICED	NEXT SERVICE							
1/4/58	200-3	Handstock	6-10-58							
	200-3	Carbide	6-10-58							
	200-3	Apex	3-10-58							
1/4/58	200-3	Apex	6-10-58							
1/4/58	200-3	Handstock	1-10-59							
	200-3	Carbide	1-10-59							
	200-3	Apex	9-10-58							
1/4/58	200-3	Apex	1-10-59							
1/4/58	200-3	Handstock	6-10-59							
	200-3	Carbide	6-10-59							
	200-3	Apex	3-10-59							
1/4/58	200-3	Apex	6-10-59							
1/4/58	200-3	Handstock	1-10-60							
	200-3	Carbide	1-10-60							
	200-3	Apex	9-10-59							
1/4/58	200-3	Apex	1-10-60							

FORM 70-100 (12-55)

Sample of card used in "round robin" file to control hydraulic reservoir oil changes.

While proper machine lubrication is one of the more inconspicuous activities conducted within a plant, this does not detract from its importance. To end with a very poor pun, it is the one activity that keeps the wheels of industry turning smoothly!

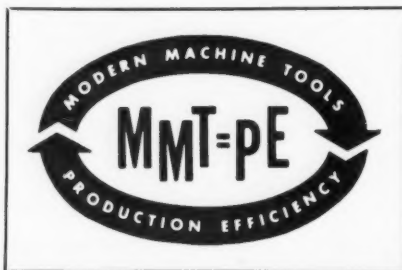
★ modern machine shop ★

High Speed Steel and Cast Nonferrous Single Point Tools.
A new American Standard covering high speed steel and cast nonferrous

single point tools and toolholders has been approved by the American Standards Association and published by The American Society of Mechanical Engineers. The new standard, designated B5.29-1959, presents sizes and tolerances for the two types of tool bits which are in common use for general purpose machining. Excluded from the standard are specialized tool bits for such applications as screw machining, boring, and so on. Nominal shank sizes of single point tool bit holders are also included in the standard.

Dimension and tolerance tables provided in the new American Standard B5.29-1959 cover three classifications: ground, pre-ground, and unground tool bits. A fourth table covers shank dimensions of tool bit holders for turning tools, cutting-off and side tools, boring tools, threading tools, knurling tools, and planer and shaper tools.

The new American Standard High Speed Steel and Cast Nonferrous Single Point Tools and Tool Holders, B5.29-1959, is available at \$1.00 a copy from the American Standards Association, 70 East 45th Street, New York 17, New York, or if desired, from The American Society of Mechanical Engineers, 29 West 39th Street, New York 18, New York.





GEOMETRIC PROGRESSION SYMBOLIZES PRECISE DUPLICATION

CALCULATED TO CUT COSTS

A truly geometric pattern is followed in precisely duplicating each UNION cutting tool, according to type and size. In your plant exactly duplicated UNION drills will protect product quality and aid in reducing drill consumption. For high volume, high quality production, specify UNION drills, reamers, milling cutters, end mills, gear cutters, hobs, carbide tools, and inserted blade cutters. Available nationally through UNION Distributors and stocked in UNION warehouses in Atlanta, Chicago, Detroit, Fort Worth, Los Angeles, New York City, and San Francisco.



UNION

UNION TWIST DRILL COMPANY, Athol, Massachusetts
S. W. Card Division, Mansfield, Mass. Butterfield Division, Derby Line, Vt.

For more data circle 427 on Postpaid Card

STANDARD 2-AXIS PRECISION



- ★ HEAVY DUTY!
- ★ V AND FLAT WAYS!
- ★ ROLLER BEARINGS!

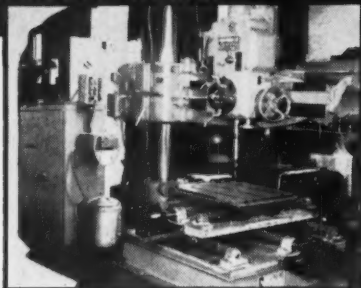


FIG. 1

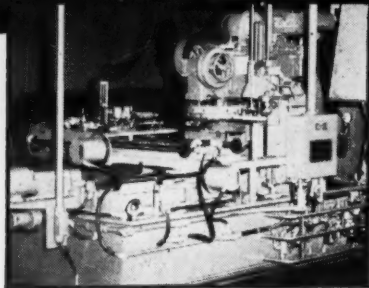


FIG. 2

Fig. 1 - Positioning Table on Radial Drill.

Fig. 2 - Shows Special Base Assembly of Positioning Table with Wiedemann Punch Press; handles Plates from 12" x 12" to 90" x 48". Maximum Program Positioning Area of Table 60" x 48".

Figs. 3 & 4 Shows Positioning Table on Custom-Built Machine with Turret Head.

TRAVERSE: Hydraulic, Electrical, Air, Mechanical or Manual.

ROTARY: Rotary Tables also available.

SION POSITIONING TABLE

Automation! Repeatability! High Production!

FOR

**NUMERICAL CONTROL!
POSITIONING! • INSPECTION!
X-RAYING! • ALIGNMENT!
MILLING! • DRILLING!
ELECTRO-CHEMICAL MILLING OR ETCHING!**

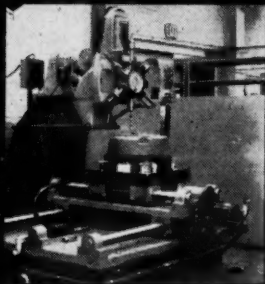


FIG. 3

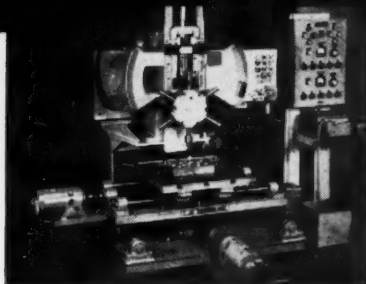


FIG. 4

**ASTE SHOW
Detroit
Apr. 21-28
Booth 1430**

the **STANDARD** electrical tool co.

MACHINE TOOL DIVISION

2487 RIVER ROAD, CINCINNATI 4, OHIO

For more data circle 428 on Postpaid Card

A SPECIAL PRESENTATION ON

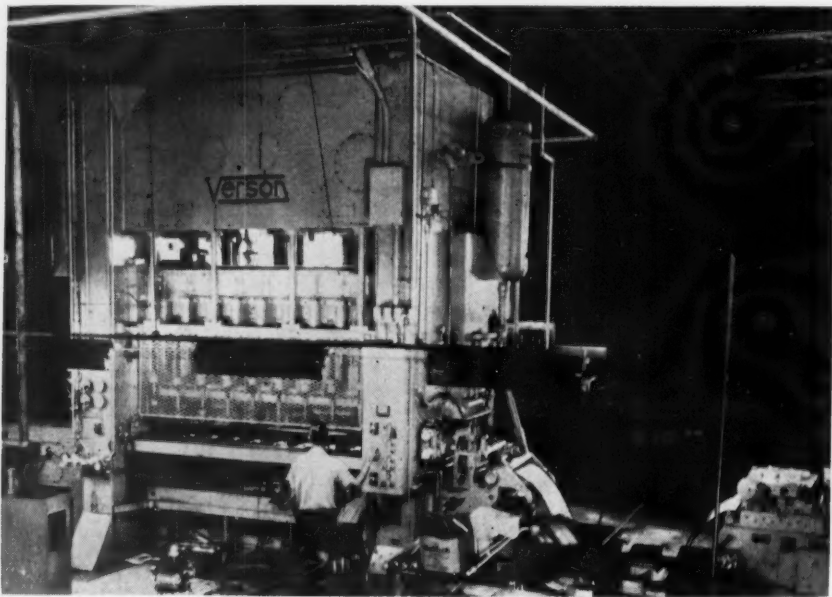
Tooling for Productivity

Automatic Production of Speedometer Housings

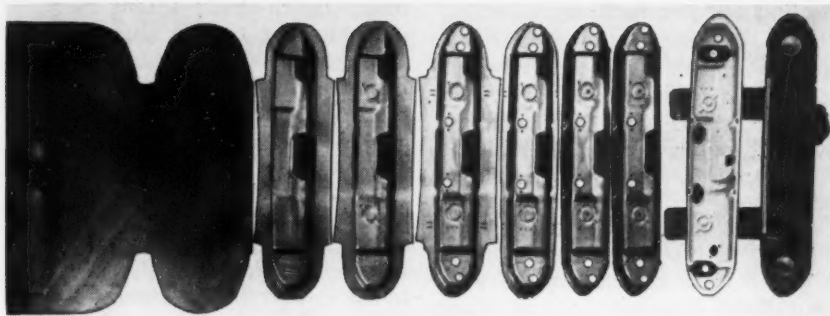
Coils of steel are transformed into automobile speedometer housings automatically at a rate of 1200 per hour in a new press recently installed at Stewart-Warner Corporation, Chicago. The press is a 300-ton capacity Verson Transmat. From coil stock fed into one side of the press to the finished part emerging at the other side, seven operations are performed automatically. The

operations are as follows: (1) notch coil, (2) cutoff and draw, (3) re-strike, (4) trim ends, pierce and notch, (5) trim sides and notch, (6) wipe flange and pierce, and (7) cam pierce.

The press has slide and bolster areas of 54 x 108 inches and has nine die stations (two are not used for this job). The slide has a 16-inch stroke and operates at 15 to 30 strokes per minute. Floor space required for the press is 324 x 244 inches. Weight is 183,000 pounds.



Press installed at Stewart-Warner for automatic manufacture of speedometer housings.



Sequence of operations performed in the automatic manufacture of speedometer housings.

In the press, parts in process are transferred from one die station to another by mechanical fingers. The feed is mechanically actuated and protected against overload by slip clutches on the power take-off shaft and on the feed bar finger racks. The coil feed consists of a rack and pinion roll feed, straightening machine and stock reel.

An Alemite grease lubrication system is provided for the counterbalance and knockout rods and cushion guides. An Alemite automatic oil lubrication system takes care of counterbalance, knockout and cushion packings.

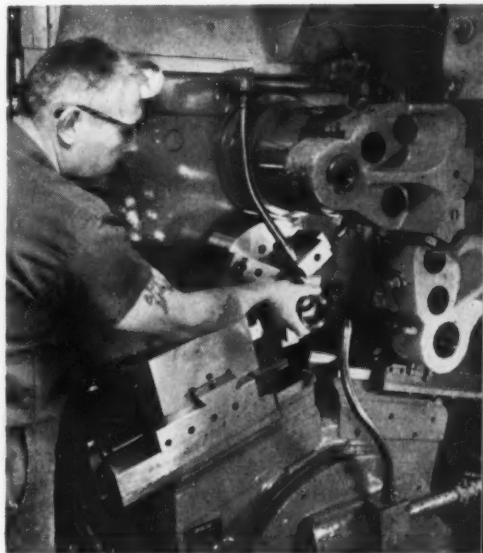
For more data circle 1 on Postpaid Card

★ modern machine shop ★

Automation in a Toolroom

Small lot machining of tool steel casings and die shells, used in the production of precision aircraft fasteners, is now being carried out automatically at rates as much as six times faster than former hand lathe methods in the toolroom of the Lamson & Sessions Company, Cleveland. Ranging in size from $1\frac{3}{8}$ to 8 inches

in diameter, the workpiece blanks are cut to length from H-12 tool steel tubing by a band saw "slugging" method. Then, employing carbide and high-speed steel cutters, the blanks are turned and bored complete



Close-up of single spindle chucking automatic, showing setup used in small-lot machining of tool steel casings and die shells.

tooling for productivity . . .

on a Warner & Swasey 2AC single spindle chucking automatic. To facilitate rapid set-up and change-over, all tooling is kept as simple as possible and is mostly of the single point type.

Average lots on the 2AC range from 15 to 30 pieces, although the company reports it has run as few as two pieces economically, including set-up costs.

For more data circle 2 on Postpaid Card

★ modern machine shop ★

Turret Drill Combines Machining and Assembly Operations

Combining assembly operations in the same setup used to drill and tap the assembled parts can be readily accomplished with a Burg-

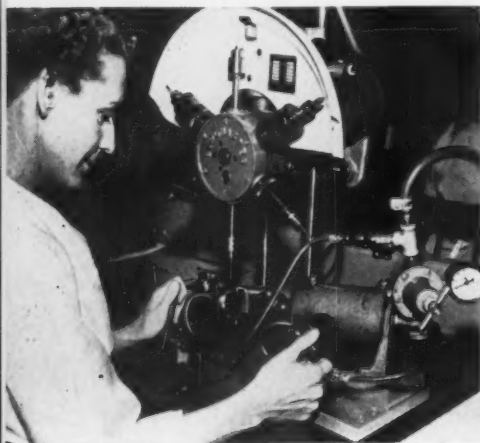
master bench-model drilling machine manufactured by the Burgmaster Corporation of Gardena, California. Such a setup saves time, eliminates extra handling and the resulting assemblies are more consistently accurate.

The machine is equipped with a six-spindle turret that power indexes at operator command to perform up to six individual operations at one location. Preselective spindle speeds shift as the turret indexes so that each spindle automatically provides the most efficient speed for the size and type of tool being used.

A leading electronic instrument manufacturer uses a Bench Model "O" Burgmaster to assemble, drill, tap and fasten a dial potentiometer assembly in a single setup. An air cylinder-operated fixture presses together the two parts—a dial and knob—and then holds the assembly for drilling, tapping and fastening by a socket set screw. The six-spindle turret is double tooled, performing the three operations twice each rotation of the turret. This eliminates loss of time which would result from indexing idle spindles.

Tapmatic tapping heads are used for tapping the drilled hole and also for chucking the hex wrenches used to drive in the socket set screw which secures the assembly. The heads are provided with a torque adjustment to suit the tap size and character of the material for elimination of tap breakage. The heads used for the hex wrenches are adjusted to supply torque at the exact tension required to secure the assembly. This makes possible the rapid fastening of the assembly in the same position it is machined.

For more data circle 3 on Postpaid Card



A leading electronic instrument manufacturer uses the bench turret drill shown herewith to assemble, drill, tap and fasten a dial potentiometer assembly in a single setup.

Carbide Insert Tooling Used to Rough Turn Square Steel Billets

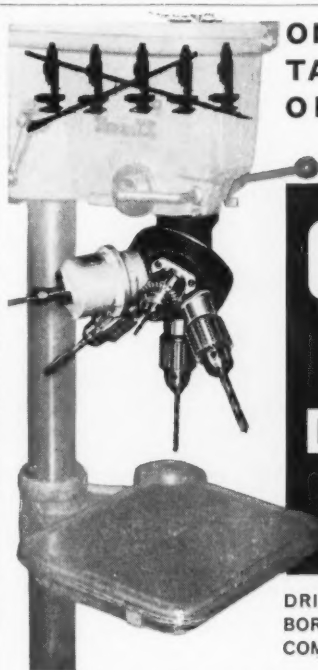
Rough turning an 8 1/4-inch square steel billet 14 inches long to cylindrical shape is rough in more ways than one. But Marvel Schebler Products Division of Borg-Warner Corporation has been making this severe jump cut economically on a production scale in its Decatur, Illinois, plant.

The turning operations leave the C-1015 steel workpiece with a 7 1/2-inch cylindrical center section, an 8 1/4-inch square base, and an 8 1/2-inch diameter collar on the other end. The cutting tool takes 960 terrific jolts per minute while turning at 240 r.p.m. from the 11 1/2-inch diameter across the corners of the billet. The cut to the 8 1/2-inch collar diameter is made at a maximum of 690 surface feet per minute, with a feed of 0.019 inch per revolution and 5/8-inch depth of cut.

Kendex tools are used on a

Gisholt 4L turret lathe to make the cut. Grade K21 square Kendex inserts have a life of three workpieces per edge. No breakage has occurred. Carbide inserts and the holder, a Kendex Style KSBR-86C tool, are products of Kennametal, Inc., Latrobe, Pennsylvania.

Before making the continuous undercut to a 7 1/2-inch diameter, a plunge cut is made to provide clear-



**ONE DRILL PRESS
TAKES THE PLACE
OF 4 OR 5 WHEN
YOU USE...**

QUADRILL 4 & 5 SPINDLE TURRET DRILLING HEADS

DRILL, REAM, TAP, COUNTER-
BORE AND COUNTERSINK ON A
COMMON TOOL AXIS.

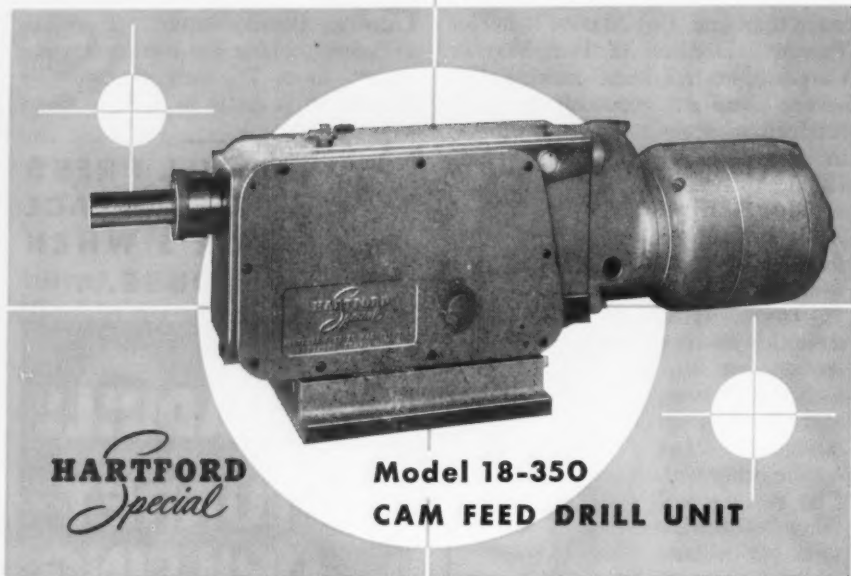
Convert your standard drill presses into precision turret drilling machines—save on floor space, capital equipment costs (up to 350%) . . . up to 70% IN DIRECT LABOR COSTS over in-line, single gang drill setups. Easy to install. Ideal for both long and short runs . . . fast setups . . . simple tooling.

WRITE TODAY FOR BROCHURE
CHICAGO QUADRILL
Company

1854 BUSSE HIGHWAY DES PLAINES, ILLINOIS
For more data circle 429 on Postpaid Card

ASSEMBLE ACCURACY

into your special machines



HARTFORD
Special

Model 18-350 CAM FEED DRILL UNIT

EXTREME ACCURACY AND RIGIDITY... because rugged, unit-cast body assures precise alignment. Heat treated wear parts and precision ball and roller bearings used throughout.

FAST CYCLING... with multiple disc clutch and brake to engage and disengage feed train from spindle drive.

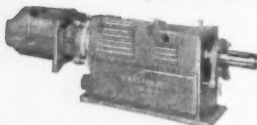
VERSATILE... because readily available commercial quick-change pick-off gears are used in feed train. Three

drive arrangements are available.

POSITIVE ACTION... and dependable performance through countless cycles. Closed cam design insures fast, positive quill return without use of springs.

DATA... $3\frac{1}{2}$ " stroke; 6000 rpm maximum spindle speed; 1000 pounds maximum thrust; 3 horsepower motor maximum.

FOR COMPLETE INFORMATION... write for Catalog No. 508.



At the same time, ask for information on Hartford Special's lines of Air Hydraulic Drill Units, including the all-new Model 17-400.

HARTFORD
Special

THE HARTFORD SPECIAL MACHINERY CO.

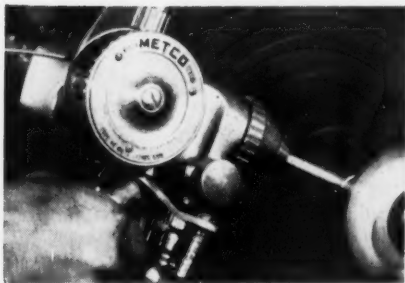
3700 Homestead Avenue, Hartford 12, Connecticut

For more data circle 430 on Postpaid Card



BOOTH NO. 1723

Complete your shop with this modern metallizing installation



WIRE GUN—Sprays any metal that can be drawn into wire form.



POWDER GUN—Sprays hard-facing alloys and ceramics in powder form.

Without metallizing, no maintenance or "job" shop can offer the same complete service as the shop that uses industry's low-cost "putting-on" tool.

With modern, low-cost metallizing equipment you can spray carbon steels, stainless, babbitts, brass, bronze, nickel, aluminum, tin, zinc, special hard-facing alloys, including tungsten carbide.

■ Save up to 90% of replacement costs on machine repair jobs ■ Do your own hard-facing at high speed, low cost ■ Apply long-wearing, corrosion-resistant coatings

A real opportunity for the smaller shop. Thousands of large, well-known companies and shops have been metallizing users for many years, not only in maintenance work but in production applications on original equipment. Now, with modern low-cost metallizing equipment this high-speed "putting-on" tool is within the reach of even the smallest shop.

FREE BULLETIN



Send off the coupon for detailed information—find out how a metallizing installation can pay for itself in a very short time. No obligation, of course.

Metallizing Engineering Co., Inc.

Flame Spray Equipment and Supplies



METALLIZING ENGINEERING CO. INC.

1177 Prospect Ave., Westbury, L. I., New York
Please send me free bulletin on metallizing.

Name _____

Title _____

Company _____

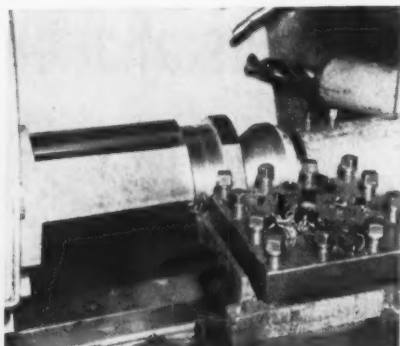
Address _____

City _____

Zone _____ State _____

For more data circle 431 on Postpaid Card

tooling for productivity . . .



Rough turning a 7 1/2-inch diameter undercut follows a severe jump cut that turned an 8 1/4-inch square steel billet to 8 1/2-inch diameter.

ance for the tool. The undercut is then made with a 1/2-inch depth of cut and 0.019-inch feed to complete the cylindrical portion of the workpiece. The metal removal rate on this operation is approximately 52 cubic inches per minute.

Other tools used on the workpiece are a Style C brazed tip tool for the plunge cut, and two other styles of Kennametal's Kendex tools to clean up the shoulder at the base of the workpiece and face the ends.

For more data circle 4 on Postpaid Card

★ modern machine shop ★

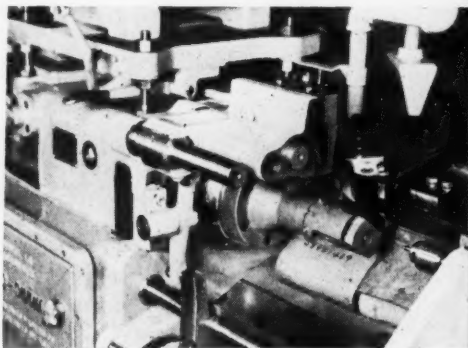
Special Tooling Adapts Standard Machine for Complex Operations

Five simultaneous operations per cycle with a single spindle machine means money saved. Acting on this premise a prominent manufacturer in the automotive field has equipped a Seneca Falls Model

"LR" Automatic Lo-Swing Lathe with special tooling to bore, face, chamfer and turn a piston skirt while centering the closed end. Because all tools operate simultaneously, cycle time is minimized. Operator simply loads and unloads machine.

An air operated centering arbor, fitted with a spring loaded centering plate, centers the piston from the bottom of the bore, while three air operated jaws center the open end. The piston is held against the centering plate by action of an air operated pull bar and a pin introduced through the gudgeon pin hole. When the piston has been clamped in position, boring, turning and facing of the open end of the skirt is accomplished with tooling mounted on the over-head slide. Simultaneously a chamfer is made using a 45-degree squaring attachment, mounted on the rear of the lathe. All tools operate simultaneously and a high hourly production is obtained. The operation is entirely automatic, the operator simply loading and unloading the parts.

For more data circle 5 on Postpaid Card

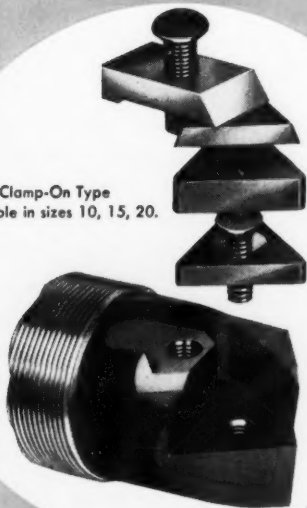


Close-up view of lathe shows special tooling used to bore, face, chamfer and turn piston skirt while centering closed end of same.

AT BOOTH 427 ASTE SHOW, April 21-28 • DETROIT

Microbore adjustable tooling! with Kendex throw-away inserts!

Clamp-On Type
Available in sizes 10, 15, 20.



Screw-On Type. Available in
sizes 3, 5, 7, 10.



Accuracy! Economy! You get the best of both. Microbore, the single point cutting tool with Micrometer vernier adjustment becomes the tool holder—rigid, adjustable to precise accuracies in seconds. Kendex mechanically held throw-away inserts do the cutting. Triangular shaped, the inserts can be indexed from tip to tip. When expended, the insert is thrown away. Replacement is simple, costs far less than re-grinding. Inserts are held in place by screw-on button or clamp for fast indexing or removal. Available in sizes 3, 5, 7, 10, 15 and 20. Write for complete information on Microbore tooling with Kendex throw-away inserts, the latest development in Microbore—the complete tooling system.

DEVLIEG MICROBORE® SYSTEM

DEVLIEG MICROBORE • DIVISION OF DEVLIEG MACHINE COMPANY

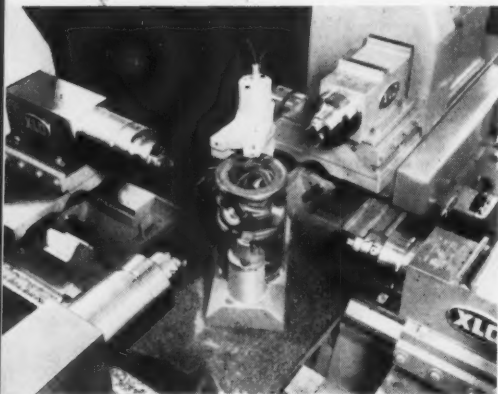
Fair Street • Royal Oak, Michigan

For more data circle 432 on Postpaid Card

tooling for productivity . . .

Standard Machine Performs Multiple Machining Operations

Constructed entirely from individual standard components, the Ex-Cell-O Way Machine shown herewith is set up for handling a cast-iron workpiece, which is manually loaded and hydraulically clamped. Positioned at 90 degrees to each other and mounted on standard way-type beds, four heavy duty precision spindles rough bore and counterbore four holes simultaneously. Except for locating surfaces, the workpiece is received as a rough casting. The boring and counterboring operations are completed in 26 seconds' machining time, to a depth of cut as high as $\frac{1}{4}$ inch per side. A trepanning operation is performed from the rough machined counterbore face after simple tool changing. For more data circle 6 on Postpaid Card



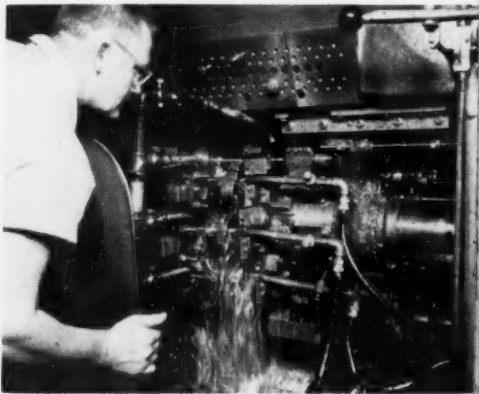
Close-up of work area shows workpiece after boring and counterboring. Tooling is shown set up to perform trepanning operation.

Dual Purpose Cutting Fluid Improves Bar Machine Performance

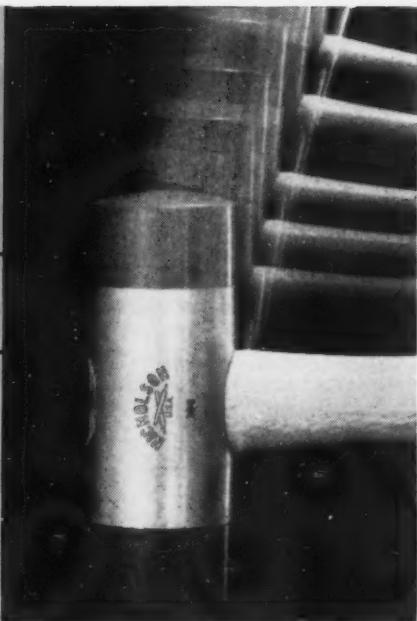
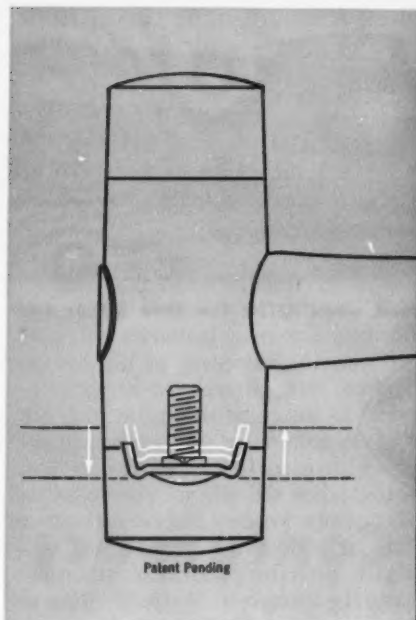
Use of a dual purpose cutting oil on two Conomatic bar machines has enabled a General Electric Company plant to achieve significant operating economies with no sacrifice of machine speeds or performance. The $1\frac{5}{8}$ -inch, 8-spindle Conomatics are used in the machining of shafts for G.E.'s fractional horsepower motors. The cutting oil is a sulfo-chlorinated fatty oil, Gulf-cut 41B, which serves both as a cutting fluid and as a lubricant for the headstock and other working parts of the automatics.

Four different sizes of motor shafts are machined at the G.E. plant. Of C1212 free machining steel, the shafts are held to a close tolerance on turning the O.D. Spindle speed is 112 r.p.m.; feed is 0.0042 i.p.r.

For more data circle 7 on Postpaid Card



In machining shafts for fractional horsepower motors, General Electric uses a dual purpose cutting oil on Conomatic bar machine.



NICHOLSON Soft-Faced Industrial Hammers take punishment in stride
FLOATING ACTION dissipates shock
TORQUE HOLDER prevents head from twisting during impact

Nicholson research and engineering pay off for you in this entirely new type of industrial hammer. It features a two-piece torque washer and stud. Here's how it works. At the point of impact, the torque washer rides freely up and down on the stud. The percussion of the hammer blow is absorbed and dissipated by this "floating action." This built-in shock-absorbing action reduces fatigue on the part of the worker.

The four gripping prongs of the torque washer are securely imbedded in the head. This prevents twisting during impact, increases productivity and work safety.

Try this new principle in industrial hammers. It will meet your most demanding requirements. You'll see and feel the difference that Nicholson development and engineering have created.

- * Industrial Distributors provide the finest goods and services in the least possible time. Our products are sold exclusively through them.

NICHOLSON FILE COMPANY, PROVIDENCE 1, R.I.



NICHOLSON



Files • Rotary Burs • Hacksaw and Band Saw Blades
 Ground Flat Stock • Industrial Hammers

For more data circle 433 on Postpaid Card



Artillery Armory, 15000 W. Eight Mile Rd., Detroit, where ASTME Tool Show will be held.



Engineering Conference and Exhibit

**"Tooling for Productivity" is theme of
1960 "Tool Show."**

More than 900 new ways to increase productivity in America's metalworking plants will be premiered at the American Society of Tool and Manufacturing Engineers' 28th Annual Convention in Detroit, April 21 to 28. More than 530 exhibitors will show and demonstrate machine tools and attachments, precision control and inspection equipment, abrasives, hand tools, automation devices, power transmission equipment, cranes, hoists, conveyors, cutting tools, assembly equipment, dies, jigs, fixtures, plastic products . . . everything that's new in tools and

tooling, under one roof, one level. A registration of 35,000 is expected.

In the Detroit Artillery Armory's seven acres, an area larger than six football fields, over \$15,000,000 worth of metalworking equipment will be on display. There will be over 6,000 products, 1,300 of them new in the last year, and 900 to be premiered at this gigantic exposition, the theme of which is "Tooling for Productivity." Hours of the Show will be 9:00 A.M. to 6:00 P.M. Thursday, Friday and Saturday, April 21, 22, and 23; 1:00 P.M. to 10:00 P.M. Monday and Tuesday,

April 25 and 26; and 9:00 A.M. to 6:00 P.M. Wednesday and Thursday, April 27 and 28. The Show will be closed Sunday, April 24.

Scientific research and education are the prime purpose of ASTM. Each year at the annual conference, seminars and technical sessions are held to provide practical down-to-earth answers to specific problems; to help individuals learn from the ideas and research of others. This year 34 technical sessions and 65 papers will be presented. Among the subjects to be covered are: tooling and tool components; status of engineering education; machining of steel casting surfaces; value analysis; radioisotopes for die life tests; automation-numerical control symposium; throw-away tip tools; air and hydraulic controls; milling high strength thermal resistant alloys; standardization of processes; and an interesting paper on "The Impossibility of Communication."

A special two-day seminar on Dimensional Metrology has been organized to give the engineer a complete picture of the science of measurement today. The seminar will be held April 21 and 22 at the

Sheraton-Cadillac Hotel. A separate fee is charged for the seminar.

The varied program will offer some interesting sidelights, too, such as a trip to Greenfield Village and the Henry Ford Museum, where a special exhibit of historically significant manufacturing equipment will be displayed. For the convenience of visitors bus service will be available to the Tool Show from Detroit airports and downtown hotels.

The Society will also hold its annual meeting during the Engineering Conference. Officers for 1960-61 will be elected and installed at the Annual Banquet which will be held on Wednesday, April 27, at the Statler Hilton Hotel.

Honoring the men who have made significant contributions to the field of tool and manufacturing engineering, the ASTM will hold an Honor Awards Dinner on Saturday, April 23. Awards to be given are the ASTM Progress Award, the Joseph A. Siegel Memorial Award, the ASTM Education Award, the ASTM Gold Medal, the ASTM Engineering Citation, and the ASTM Research Medal.

A special honor, the annual Eli

Dramatic skyline of City of Detroit, which will host ASTM 1960 Engineering Conference.



ASTME Tool Show . . .

Whitney Lecture Award, will be accorded to Dr. Allen V. Astin, Director, National Bureau of Standards, U. S. Department of Commerce. Dr. Astin will receive a bronze plaque. Traditionally the winner gives a lecture and Dr. Astin will present his talk at a luncheon which is scheduled to be held on Monday, April 25, at the Statler Hilton Hotel.

Some of the internationally known scientists and educators participating

in the program will be Rudolph F. Bannow, President, National Association of Manufacturers; Dr. Thomas J. Bulat, Manager, Sonic Energy Applications and Research Laboratories, Bendix Aviation Corporation, Davenport, Iowa; The Honorable George D. Clyde, Governor of Utah; Dr. William L. Everitt, Dean, College of Engineering, University of Illinois, Urbana, Ill.; Dr. Stanley J. Idzerda, Director, Honors College, Michigan State University, East Lansing, Mich.; Dr. Abe Silverstein, Director, Office of Space Flight De-

1959-60 Officers of the American Society of Tool and Manufacturing Engineers



Left to right, seated: Charles M. Smillie, Treasurer; Philip R. Marsilius, Vice President; H. Dale Long, Vice President; and Wayne Ewing, President. Left to right, standing:

H. Verne Loeppert, Secretary; David A. Schrom, Vice President; and William Moreland, Vice President. Top right: Harry E. Conrad, Executive Secretary of the ASTME.

ALLEN



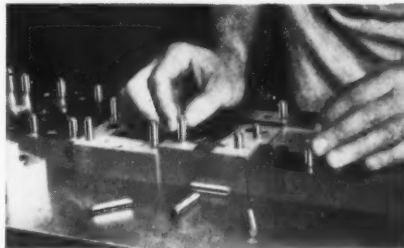
ALLEN is the dowel pin that gives you **PLUSES**

Your ALLEN Industrial Distributor can show you a good many ways to use ALLEN Dowel Pins, in addition to conventional uses in tool and die work. You can use them as economical roller bearings, axles, precision plugs, hinge and wrist pins—and in many other ways.

You can cut the cost of your product substantially, too—because your ALLEN Distributor can supply these strong, accurate, mirror-finished Dowel Pins in standard sizes right from stock.

Made of special Allenoy steel; surface hardened to 62-64 Rockwell C; precision ground to .0001" with micro-inch finish of 6 RMS max. Check your Allen Handbook or Catalog for detailed specs and standard sizes, or write direct for samples and technical information.

Two standard oversizes: .0002 for press fits between mating parts; .001 for repairs and holes machined oversize.



Genuine ALLEN products are available only through your ALLEN Distributor—he's always ready, willing and able to give you prompt, practical service.

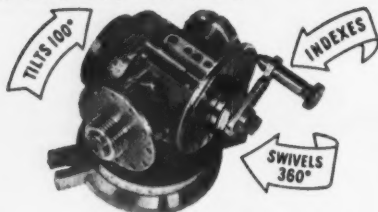


ALLEN MANUFACTURING COMPANY

HARTFORD 1, CONNECTICUT, U.S.A.

For more data circle 434 on Postpaid Card

VERSATILITY



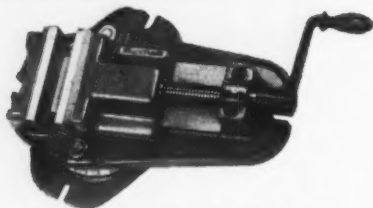
DIVIDING HEADS

6½" or 8" swing

Swivels in 2 planes

Holds work between centers,
in chucks and collets.

ACCURACY



5" MACHINE VISE

Plain or swivel base

Precision ground screw

V-slides with adjustable gibs

Oil hardened and ground jaws

ECONOMY

Save time and money with

Ellis tools. Write:

NICHOLS-MORRIS

CORPORATION

76-H MAMARONECK AVENUE

WHITE PLAINS, N.Y.

For more data circle 435 on Postpaid Card

164 MODERN MACHINE SHOP

ASTME Tool Show . . .

velopment, National Aeronautics and Space Administration; and Dr. Ross M. Trump, Dean, Graduate School of Business and Public Administration, Washington University, St. Louis, Missouri.

Leslie B. Bellamy, Vice President, Abrasive and Metal Products Company, Detroit, is chairman of the Detroit Host Committee for the meeting. The Honorary Host Committee is comprised of five Detroit industrial leaders. They are L. L. Colbert, President, Chrysler Corporation; Malcolm P. Ferguson, President, Bendix Aviation Corporation; Henry Ford, II, President, Ford Motor Company; John F. Gordon, President, General Motors Corporation; and George Romney, President, American Motors Corporation.

A number of plant tours have been scheduled during the 1960 ASTME Conference and Tool Show. The firms who will host these tours are: Ford Rouge Stamping and Assembly Plants; Ex-Cell-O Corporation; Chrysler Corporation of Canada; Ojibway Salt Mines of Canada; General Motors' Detroit Diesel Engine Plant; Ford Motor Company Tool and Die Building; Ford Rotunda; Corvair Plant; two Chrysler Engine Plants; Argus Camera Plant; Enrico Fermi Atomic Energy Plant; Burroughs Corporation; General Motors Technical Center; Ford Transmission and Chassis Division; Great Lakes Steel Corporation; and Star Cutter Company.

Elaborate plans have also been made for the wives who accompany their husbands to the ASTME Engineering Conference and Exhibit.

April, 1960

YESTERDAY'S PIONEER . . . TODAY'S LEADER



WELDON / COUNTERSINKS AND DEBURRING TOOLS

60°, 82°, 90°, 100° ANGLES

CHATTERLESS!

Greater ease in cutting and longer life are the outstanding features of these Weldon tools for countersinking and deburring operations.

Chatter is eliminated because of the single cutting edge.

A trial will convince you.

THESE TOOLS INCLUDE
CUTTING DIAMETERS
RANGING FROM 1/4" TO 3"

WRITE FOR FURTHER DETAILS



Catalog list numbers are now marked on all Weldon tools and holders as an aid when reordering . . . another WELDON FIRST.

Weldon distributors throughout U.S.A. and Canada carry complete stocks to serve you.

THE WELDON TOOL COMPANY

3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

For more data circle 436 on Postpaid Card

April, 1960

MODERN MACHINE SHOP

165

Technical Program

ASTME 28th Annual Meeting

THURSDAY, APRIL 21

3:30 P. M. MEDICINE—SURGERY—ENGINEERING

Sheraton-Cadillac Hotel, Founders Room

Chairman: Karl G. Nowak, Factory Superintendent, Fenwal Incorporated.

"THE ENGINEER IN MEDICINE" (Paper No. 299), by Dr. Carl W. Walter (F.A.C.S.) Associate Clinical Professor of Surgery, Harvard Medical School; Surgeon, Peter Bent Brigham Hospital.

"REHABILITATION NEEDS THE ENGINEER" (Paper No. 300), by Willis C. Gorthy, C.E., Director, Institute for the Crippled and Disabled.

"TOOLING FOR THE HANDICAPPED—A CHALLENGE TO ENGINEERS" (Paper No. 301), by John W. Greve, Editor, *The Tool Engineer Magazine*, American Society of Tool and Manufacturing Engineers.

FRIDAY, APRIL 22

9:30 A.M. SOME PRODUCTION CONSIDERATIONS

Sheraton-Cadillac Hotel, Founders Room

Chairman: Kurt O. Tech, Vice President in Charge of Engineering, Cross Co.

"THE TURRET DRILL AND TAPE CONTROL: AN UNBEATABLE COST-CUTTING UNIVERSAL PRODUCTION TOOL" (Paper No. 277), by J. L. Burg, Vice President in Charge of Sales and Engineering, Burg Tool Manufacturing Company, Incorporated.

"SOME QUALITY CONSIDERATIONS IN THE DESIGN OF AUTOMATIC ASSEMBLY MACHINES" (Paper No. 263), by Arthur J. LaRue, Associate Engineer, International Business Machines Corporation, Burlington, Vermont Plant.

9:45 A.M. TECHTOUR "GUN DRILLING I"

Sheraton-Cadillac Hotel, Crystal Ballroom

Chairman: George R. Squibb, President, Automotive Conversion Corporation.

"GUN DRILLING IN PRODUCTION" (Paper No. 252), by Joseph Savage, Production Engineer, The Power Train Group, The Corporate Manufacturing Staff & Services, Chrysler Corporation.

"PRESSURE-COOLANT DRILLS AND REAMERS FOR PRECISION HOLE PRODUCTION" (Paper 267), by Herbert Gregg, Chief Engineer, Star Cutter Company.

"SELECTION AND USE OF CUTTING FLUIDS FOR GUN DRILLING AND REAMING" (Paper No. 275), by Russell F. Balow, Staff Engineer, Industrial Technical Division, Products Department, Socony Mobil Oil Company, Incorporated.

"MACHINE-TOOL CONSIDERATIONS IN MULTIPLE GUN-DRILLING AND GUN-BORING OPERATIONS" (Paper No. 276), by Eugene R. Delamater, Vice President, Foote-Burt Company.

8:30 P. M. ORDNANCE TOOLING

Sheraton-Cadillac Hotel, Founders Room

Chairman: Eugene Makie, Manager-Manufacturing Engineering, Utica Division, Curtiss-Wright Corporation.

"ORDNANCE MACHINE-TOOLING POLICIES" (Paper No. 273), by Fred Wittber, Assistant to the Chief, Industrial Division, Ordnance Weapons Command and John F. Pauls, Deputy Chief, Industrial Mobilization Branch, Industrial Division, Ordnance Weapons Command.

"PILOT LINE TOOLING OF SMALL ARMS WEAPONS AT SPRINGFIELD ARMORY" (Paper No. 274), by Thaddeus J. Brusnicki, Project Engineer M-14 Rifle and August R. Brus, Chief, Methods Section (Production Engineering Branch), Springfield Armory.

8:30 P. M. TECHTOUR "GUN DRILLING II"

Sheraton-
Cadillac
Hotel,
Crystal
Ballroom

Chairman: George R. Squibb, President, Automotive Conversion Corporation.

PANEL PARTICIPANTS

Joseph Savage, Production Engineer, The Power Train Group, The Corporate Manufacturing Staff & Services, Chrysler Corporation.

Herbert Gregg, Chief Engineer, Star Cutter Company.

Russell F. Balow, Staff Engineer, Industrial Technical Division, Products Department, Socony Mobil Oil Company, Inc.

Eugene R. Delamater, Vice President, Foote-Burt Company.

Glen Johnston, Vice President Manufacturing, Star Cutter Company.

SATURDAY, APRIL 23

9:15 A.M. STANDARDIZATION AND MACHINE DESIGN

Sheraton-
Cadillac
Hotel,
Founders
Room

Chairman: Carl J. Oxford, Jr., Director of Research, National Twist Drill and Tool Company.

"STANDARDIZATION OF PROCESSES, TOOLING AND TOOL COMPONENTS AS APPLIED TO ECLIPSE-PIONEER" (Paper No. 294), by David French, Assistant Factory Manager, Eclipse-Pioneer Division, Bendix Aviation Corporation.

"ON THE EFFICIENCY OF MACHINE-TOOL SUSPENSION" (Paper No. 264), by Dr. Miroslav Sadowy, Assistant Professor of Mechanical Engineering, Marquette University, College of Engineering.

10:00 A.M. ENGINEERING ENROLLMENTS

Sheraton-
Cadillac
Hotel,
Crystal
Ballroom

Chairman: Clyde L. Fanning, Assistant Department Chairman, General Motors Institute.

"SOME SIGNIFICANT ASPECTS OF CURRENT ENGINEERING ENROLLMENTS" (No Paper), by William Thurlow Alexander, Dean of Engineering, Northeastern University.

"TRENDS IN ENGINEERING ENROLLMENTS" (No Paper), by Leroy K. Wheelock, Executive Secretary, Engineering Manpower Commission, Engineers Joint Council.

2:30 P. M. ENGINEERING CURRICULUM

Sheraton-
Cadillac
Hotel,
Founders
Room

Chairman: Arthur F. Gould, Head, Department of Industrial Engineering, Lehigh University.

"ENGINEERING EDUCATION FOR THE FUTURE" (No Paper), by Dr. William L. Everitt, Dean, College of Engineering, University of Illinois.

"TOOL ENGINEERING—OUR PLACE IN EDUCATION" (Paper No. 293), by Frederick Preator, Head, Department of Tool Engineering, Utah State University.

2:45 P. M. IMPROVEMENTS SPARKED BY RESEARCH

Sheraton-
Cadillac
Hotel,
Crystal
Ballroom

Chairman: Richard T. Thornton, General Manufacturing Manager, Hardware and Accessories Division, Ford Motor Company.

"A TOOL DYNAMOMETER FOR ELECTROLYTIC GRINDING RESEARCH" (Paper No. 287), by Professor Reno R. Cole, Department of Engineering and Robert A. Needham, Associate Professor of Engineering, University of California.

"IMPROVING WELDING TECHNIQUES IN A MEDIUM-SIZED PLANT" (Paper No. 265), by J. L. Aldred, Chief Engineer, Sherman Products, Incorporated.

ASTME Technical Program . . .

MONDAY, APRIL 25

9:15 A.M. VALUE ANALYSIS I

Sheraton-Cadillac Hotel, Grand Ballroom

Chairman: Albert Underwood, Jr., Quality Control Manager, Windsor Manufacturing Operations, Ford Motor Company of Canada.

"THE TOOL ENGINEER'S ROLE IN EFFECTIVE PRODUCT PLANNING" (Paper No. 266), by C. Farnworth, Manager, Product & Program Analysis, Corporate Planning Staff, Chrysler Corporation.

9:30 A.M. COMMUNICATIONS

Sheraton-Cadillac Hotel, Crystal Ballroom

Chairman: Carl S. Abbott, President, J. N. Fauver Company, Inc.

"THE IMPOSSIBILITY OF COMMUNICATION" (Paper No. 302), by Patrick M. Beatts, Data Processing Division, International Business Machines Corporation.

9:45 A.M. METAL CUTTING I

Sheraton-Cadillac Hotel, Founders Room

Chairman: H. J. Siekmann, Manager-Market Development and Research, Metallurgical Products Department, General Electric Company.

"MACHINING OF STEEL CASTING SURFACES" (Paper No. 249), by Frank L. Brugger, Products Sales Manager, Kennametal Incorporated.

"MILLING ZIRCALOY—RECOMMENDATIONS FROM RESEARCH" (Paper No. 250), by William Pentland, Research Supervisor, The Cincinnati Milling Machine Company.

2:30 P.M. VALUE ANALYSIS II

Sheraton-Cadillac Hotel, Founders Room

Chairman: Julian J. VanMaele, Partner, Allied Engineering Company.

"OPERATIONAL PRODUCT ANALYSIS AND COST ESTIMATING" (Paper No. 268), by W. L. Shepherd, Manager, Chassis, Electrical and Truck Estimating, Corporate Planning Staff, Chrysler Corporation.

2:45 P.M. 25E ASME EXCHANGE PAPERS

Sheraton-Cadillac Hotel, Crystal Ballroom

Chairman: Robert E. McKee, Sales Manager, R. K. LeBlond Machine Tool Company.
"ENGINEERING APPLICATION OF DIGITAL COMPUTERS" (Paper No. 278), by H. D. Irwin, Engineering Service Division, Mechanical Equipment Consultant, E. I. du Pont de Nemours & Company, Incorporated.

"NEW DEVELOPMENTS IN THE THEORY OF THE METAL-CUTTING PROCESS: THE PLOUGHING PROCESS IN METAL CUTTING" (Paper No. 251), by Paul Albrecht, Research Associate, Physical Research Department, The Cincinnati Milling Machine Company.

7:30 P.M. RADIATION AND THE TOOL ENGINEER

Sheraton-Cadillac Hotel, Crystal Ballroom

Chairman: Harold N. Bogart, Manager, Process Development Department, Ford Motor Company.

"THE PROPOSED USE OF RADIOISOTOPES FOR DIE-LIFE TESTS" (Paper No. 269), by Donald Peckner, Associate Editor, *Materials in Design Engineering*.

"SONIC ENERGY AS A PRODUCTION TOOL" (Paper No. 270), by Dr. Thomas J. Bulat, Manager, Sonic Energy Applications and Research Laboratories, Bendix Aviation Corporation, Pioneer-Central Division.

now
machine
anything,
anywhere

DUMORE
VERSA-MIL®

GIANTS
FOR WORK--
yet move easily
from job to job

MILL • BORE • SHAPE
SLOT • GRIND • DRILL
at lower cost

Compact, rigid, portable units
in three sizes. Perform in any
position. Built-in power and
feeds. Use independently or
attach to machine tools for
secondary operations. Save
handling, moving, set-up and
down-time. Also machine
in-place parts too big for
standard tools.

SEE IT WORK AT ASTE SHOW,
DETROIT—BOOTH 2249



3 sizes for all
tooling needs:

SMALL WORK MODEL 1— $\frac{1}{4}$
hp., removes metal at $\frac{1}{8}$ cu.
in. per minute,* 10" min.
lathe mounting.

MEDIUM DUTY MODEL 2 —
 $\frac{3}{4}$ hp., removes metal at $\frac{3}{4}$
cu. in. per minute,* 13"
min. lathe mounting.

LARGE WORK MODEL 3— $1\frac{1}{2}$
hp., removes metal at $1\frac{1}{2}$
cu. in. per minute,* 18"
min. lathe mounting.

*in mild steel

ask your local
**DUMORE INDUSTRIAL
SUPPLY DISTRIBUTOR**
for a demonstration
or write for Bulletin VM-60



YOU CAN DO MORE WITH

DUMORE

ALL-PURPOSE, PRECISION
METALWORKING TOOLS

Versa Mil • Drill-N-Tap Units • Drilling Units • Feed Tables
Drill Heads • Micro-Drills • Drill Grinders • Tool Post
Grinders • Hand Grinders • Flex-Shaft Tools • Precision
Spindles and Accessories.

THE DUMORE COMPANY

1302 Seventeenth Street, Racine, Wisconsin

For more data circle 437 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 169

ASTME Technical Program . . .

7:45 P.M. METAL CUTTING II

Sheraton-Cadillac Hotel, Founders Room

Chairman: Wayne Blackman, Manager, Production Engineering, Power Systems Works, Thompson Ramo Wooldridge, Incorporated.

"PRODUCTION APPLICATION OF CERAMICS TO THE MACHINING OF HIGH-STRENGTH STEELS" (Paper No. 253), by John W. Rodd, Experimental Methods Project Leader and Dominic T. Bisceglia, Section Chief, Ordnance Corps, Watervliet Arsenal.

"PRECISION FORMING TECHNIQUES—COLD SWAGING" (Paper No. 290), by Philip A. G. Carbonaro, Director of Rodman Laboratory and Samuel Valencia, Chief, Metal Forming, Welding and Heat Treating Branch, Rodman Laboratory, Watertown Arsenal.

TUESDAY, APRIL 26

9:30 A.M. HIGH ENERGY FORMING

Sheraton-Cadillac Hotel, Founders Room

Chairman: Lloyd G. Briggs, Management Consultant.

"WHY FORM EXPLOSIVELY?" (Paper No. 291), by Dorsie C. Harleman, Project Engineer, Basic Industry Branch, Manufacturing Methods Division, Wright-Patterson Air Force Base and A. F. Watts, Production Design Engineer "A", Lockheed Aircraft Corporation.

"A CRITICAL REVIEW OF HIGH-ENERGY FORMING METHODS" (Paper No. 292), by William W. Wood, Supervisor, Manufacturing Research, Vought Aeronautics Division, Chance Vought Aircraft Incorporated.

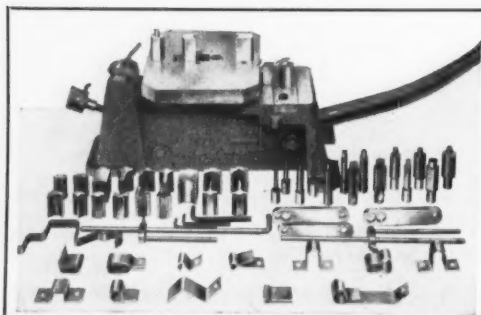
2:45 P.M. METAL CUTTING III

Sheraton-Cadillac Hotel, Founders Room

Chairman: Charles F. Brigner, Jr., Chief Engineer, Valenite Metals Division, The Valeron Corporation.

"RECENT DEVELOPMENTS IN ULTRA HIGH-SPEED MACHINING" (Paper No. 255), by Robert L. Vaughn, Producibility Methods Engineer, Lockheed Aircraft Corporation and Robert T. Krueck, Project Engineer, AMC Aeronautical Systems Center, Manufacturing Methods Division, Wright-Patterson Air Force Base.

"THE EFFECTS OF NEW DEVELOPMENTS IN METALWORKING ON THE PRODUCIBILITY OF HIGH-TEMPERATURE METALS" (Paper No. 256), by Richard H. Patchen, Production Engineer, Fabrication Engineering Aerojet-General Corporation.



Multiform

BENDER CUTTER

Users report the Multiform Bender one of the handiest tools in the shop. No special tooling . . . Bends, Cuts, Punches, Flats, Rounds into Any Shape, Brackets, Springs, Busbars, Wire Forms, Aircraft Work, and Steel Rule Dies for Metal Blanking.

AIR OR HAND MODELS FOR UP TO 1/4" to 4" MATERIAL

Write for brochure which illustrates and describes the four bender models.

J. A. RICHARDS CO.
Dept. 6-M Kalamazoo, Mich.

For more data circle 438 on Postpaid Card

new

GREAVES

2-XH Milling Machines

more
power at
the cutter!

The completely new GREAVES No. 2-XH Milling Machine brings added versatility, increased operational ease, and more power where it's needed most . . . at the cutter!

It utilizes two motors, one for spindle drive; a separate motor for moving table, saddle and knee. Compare this and the other outstanding features of the new Greaves Mill. You'll see why Greaves is "The MOST Mill for the LEAST Money."

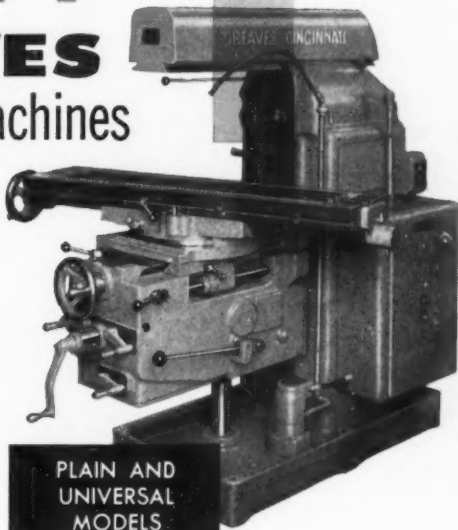
Write for detailed literature!

GREAVES
MACHINE TOOL DIVISION

J. A. FAY & EGAN COMPANY

2700 Eastern Avenue, Cincinnati 2, Ohio

For more data circle 439 on Postpaid Card



PLAIN AND
UNIVERSAL
MODELS

- Wide range of speed/feed combinations for any type material, any type job.
- Heavy, internally ribbed column casting and heavy duty rectangular overarm for maximum rigidity.
- Large, heavy-duty knee, saddle and table provide accuracy for all types of milling.
- New 7 1/2 HP spindle drive motor, with separate motor for movable components, provides extra power for heavy milling.
- Easy-to-reach controls. Handwheels and vertical crank disengage automatically when not in use.
- New rapid traverse lever within operating control area.
- Separate drive motor for table, saddle and knee provides more smooth balanced power at the cutter.

ASTME Technical Program . . .

7:45 P. M. PRODUCTION PROGRAMMING

Sheraton-
Cadillac
Hotel,
Founders
Room

Chairman: Wayne M. Edward, Manager, Production Engineering, Ford Motor Company.

"A NEW APPROACH TO PRODUCTION CONTROL" (Paper No. 295), by F. C. Janke, Executive Vice President and General Manager, Hancock Industries Inc.

"BUILT-IN PRODUCTION PROGRAMMING SAVES MONEY" (Paper No. 296), by Michael Zajac, Vice-President Engineering, Buhr Machine Tool Company.

WEDNESDAY, APRIL 27

9:15 A.M. METAL CUTTING IV

Sheraton-
Cadillac
Hotel,
Founders
Room

Chairman: Jack Ketchman, Manager, Production Services Control Department, Production Programming & Control Office, Ford Motor Company.

"MILLING HIGH-STRENGTH THERMAL-RESISTANT ALLOYS" (Paper No. 257), by Norman Zlatin, Vice President, Metcut Research Associates Incorporated and Robert T. Krueck, Project Engineer, AMC Aeronautical Systems Center, Manufacturing Methods Division, Wright-Patterson Air Force Base.

"DRILLING VERY HIGH-STRENGTH AND THERMAL-RESISTANT METALS" (Paper No. 258), by Ralph G. Kennedy, Director of Laboratories, Robert Johnson, Tool Research Engineer, Nelson Marrotte, Manager of Metallurgical Research and Edwin Brezina, Manager of New Product Development, The Cleveland Twist Drill Company.

9:30 A.M. HEAT AND THE TOOL ENGINEER

Sheraton-
Cadillac
Hotel,
Crystal
Ballroom

Chairman: William E. Benninghoff, President, Industrial Heating Equipment Association and Vice President and General Manager, Tocco Division, Ohio Crankshaft Company.

"CONTROLLED FURNACE ATMOSPHERES IMPROVE PERFORMANCE OF CUTTING TOOLS AND DIES" (Paper No. 297), by Russell Frank Novy, Assistant Director of Research, Lindberg Engineering Company.

"PRINCIPLE AND CHARACTERISTICS OF SALT-BATH FURNACES" (Paper No. 298), by Leon B. Rosseau, President, Ajax Electric Company.

2:00 P. M. TRACER CONTROL

Sheraton-
Cadillac
Hotel,
Founders
Room

Chairman: Don A. Cargill, President, Cargill Detroit Corporation.

"NUMERICAL CONTROL VERSUS TRACER CONTROL OF MACHINE TOOLS" (Paper No. 285), by Leo M. Cross, West Coast Regional Sales Manager, True-Trace Corporation.

"APPLICATIONS OF NUMERICAL CONTROL PROVEN IN PRACTICE" (Paper No. 286), by Richard A. Sitts, Application Engineer, Metalworking Machinery Engineering, Apparatus Sales Division, General Electric Company.

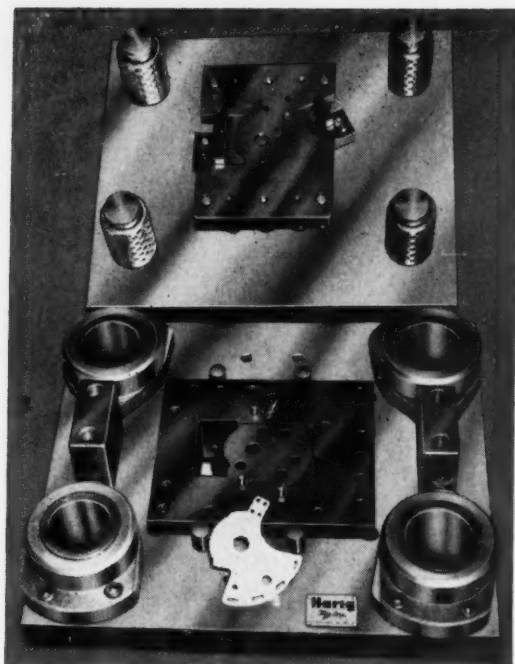
2:15 P. M. NEW PROCESSES

Sheraton-
Cadillac
Hotel,
Crystal
Ballroom

Chairman: James H. Challoner, Supervisor—Processing and Tool Design, Chrysler Corporation of Canada.

"PLASMA-ARC SPEEDS MANY METALWORKING PROCESSES" (Paper No. 288), by James A. Browning, Director, Thermal Dynamics Corporation.

"MACHINING AND WELDING WITH ELECTRON BEAM" (Paper No. 289), by Karl Heinz Steigerwald, Manager, Electron Beam Department, Carl Zeiss Company, and Vice President, Electrona, Incorporated.



PART: Index Plate OPERATION: Shaving
MATERIAL: .063 C.R.S.

ARE YOU OVERLOOKING A HARIG CARBIDE DIE APPLICATION?

HARIG CARBIDE DIES ARE THE LOGICAL ANSWER TO LOW COST-HIGH PRODUCTION RUNS!

Leading manufacturers are turning to Harig Carbide Dies for forming, drawing, shaving and notching in addition to blanking and piercing applications . . . because they consistently out-produce steel dies 10-15 to 1 (fewer grinds mean reduced maintenance and set-up costs), yet cost about $\frac{1}{2}$ more than steel. On long stamping runs, one Harig Carbide Die can take the place of several steel dies—at a great savings to you.

We would be pleased to consult with you on your next tooling program and suggest either Harig Carbide or Steel Dies to fit your needs.



WRITE FOR CATALOG

5765 W. HOWARD ST., CHICAGO 31, ILL.

Visit our Booth 1045 at the ASTE Tool Show

For more data circle 440 on Postpaid Card

THURSDAY, APRIL 28

9:15 A.M. METAL CUTTING V

Sheraton-Cadillac Hotel, Founders Room

Chairman: Bruce A. Wharram, Tool Supervisor, Chevrolet Motor Division, Passenger Transmission Plant, General Motors Corporation.

"COST SAVING THROUGH THE USE OF THROWAWAY TOOLING—THE VBU SYSTEM" (Paper No. 259), by Joseph W. Heinmiller, General Superintendent-Production Chrysler Corporation.

"NEW DEVELOPMENTS IN THROWAWAY BORING-TOOL APPLICATION" (Paper No. 260), by William Yagus, Chief Engineer, The Valeron Corporation.

9:30 A.M. CONTROL VALVES

Sheraton-Cadillac Hotel, Crystal Ballroom

Chairman: Frank L. Mackin, Department Chairman, Engineering Shops, General Motors Institute.

"IN-PLANT APPLICATION OF AIR CONTROLS" (Paper No. 271) by Walter D. Ludwig, President, Mechanical Air Controls, Incorporated.

"USING NEW SIGNAL SOURCES FOR HYDRAULIC-CONTROL VALVES" (Paper No. 272), by John J. Pippenger, Vice President and Chief Engineer, Double A Products Company, Subsidiary of Brown & Sharpe Manufacturing Company.

2:00 P.M. METAL CUTTING VI

Sheraton-Cadillac Hotel, Founders Room

Chairman: William C. Killen, Assistant Master Mechanic, Pontiac Motor Division, General Motors Corporation.

"MILLING WITH THROWAWAY INSERTS" (Paper No. 261), by Anthony S. Rogers, General Sales Manager, Wesson Company.

"USER'S VIEWPOINT ON THROWAWAY-TIP MILLING CUTTERS" (Paper No. 262), by Clifford P. Farr, Manager of Tooling Facilities, Massey-Ferguson Limited.

GRIND: RADIUS — ANGLES — on your SURFACE GRINDER
ADAPTERS TO FIT YOUR CYLINDRICAL GRINDERS

RADIUS DRESSER \$44.00

Diamond \$8.00



ORDER DIRECT
on our 10 day
money back
guarantee

Chatter Resistant, Spring Loaded Spindle

Hardened shaft—bearing adjustable for wear.

Diamond always perfectly centered.

Easily set adjustable 180° stops.

All surfaces ground true from hole.

CAPACITY—1½" convex to 4" concave.

10" Wheel size for DeALL and NORTON Grinders—\$49.00. Diamond \$8.00.

14", 20", 24", in stock, low price.

ANGLE DRESSER. Removable

PRECISION ANGLE PLATE,

Six sides ground.

\$49.00

DIAMOND \$8.00

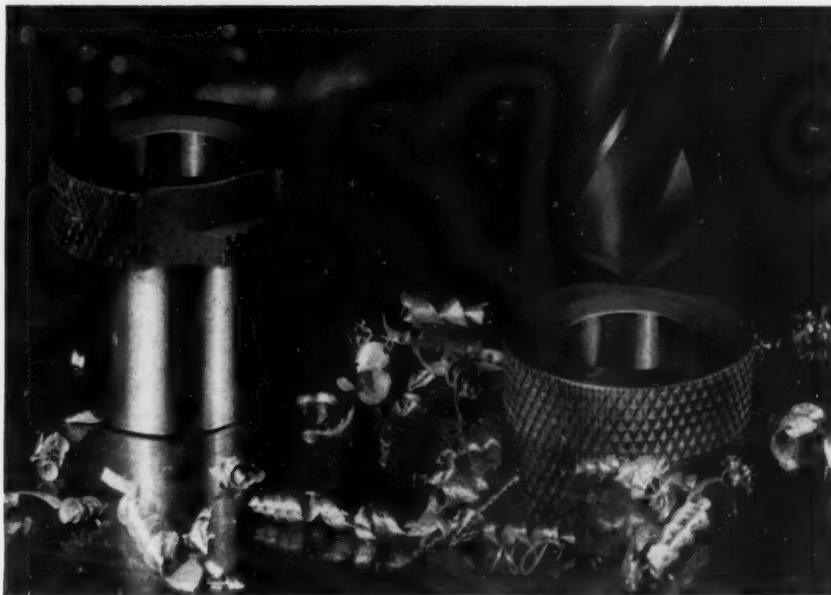


Chatter resistant, dust sealed, hardened slide. All surfaces precision ground or honed. Ball thrust bearing. Set easily and accurately.

The "Mighty Midget" Line

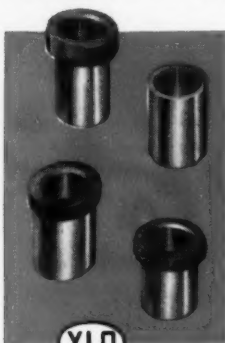
SPERMAN METAL SPECIALTIES • 2199A E. 21st ST. • BROOKLYN 29, N. Y.

For more data circle 441 on Postpaid Card



**Up to twice as much production
per .001" of wear!**

TEST REPORT SHOWS THERE IS A DIFFERENCE IN BUSHINGS



Ex-Cell-O
For Precision

Ex-Cell-O Bushings out-perform competition.

An automotive manufacturer put Ex-Cell-O Bushings up against two other leading brands in a practical on-the-job test. Result: Ex-Cell-O out-produced brand A by 1210 pieces, brand B by 345 pieces! Average number of parts pro-

duced during .001" wear:

Brand A...1,045 pieces
Brand B...1,910 pieces
Ex-Cell-O...2,255 pieces

Try Ex-Cell-O Bushings and see for yourself.

Catalog available on request.

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING AND BORING SPINDLES • CUTTING TOOLS • TORQUE ACTUATORS •
RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT
For more data circle 442 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 175

ASTME Plant Tours

A number of highly interesting tours have been arranged by the Plant Tours Committee. No cameras are permitted on any tour unless expressly indicated. All tours are for men only, over 18 years of age. Proof of citizenship, birth certificate or naturalization papers, required on all Canadian tours. Tours depart promptly at the starting times indicated below. Round trip transportation is \$1.75 per tour.

FRIDAY, APRIL 22

8:30 A.M. FORD STAMPING AND FINAL ASSEMBLY PLANT (River Rouge)

Tour No. 1 Buses leave from Statler and return to Armory. LIMIT 100 VISITORS. The "Rouge", designed to be a manufacturing unit almost entirely independent of outside suppliers, is situated on a tract 1½ miles long and 1 mile wide, covering a 1200 acre strip. Over 40,000 daily workers staff this huge manufacturing plant; in a single day over 6800 trucks, 40,000 automobiles and 150,000 pedestrians pass through the gates. New cars are driven away from the final assembly line at the rate of 1 per minute. At the Stamping Plant visitors will witness the stamping of sheet metal parts in every shape and form.

8:30 A.M. EX-CELL-O CORPORATION

Tour No. 2 Buses leave from Statler and return to Armory. LIMIT 50 VISITORS. Visitors will see heavy machinery finishing large cast and welded components for Ex-Cell-O built precision machines. They will see the manufacture of broaches, cutting tools and counter bores from bar stock through heat treat to the finished tool. They will also see the manufacture and assembly of precision boring machines, precision thread grinders, tape control machines and Pure-Pak milk packaging machines.

1:00 P.M. STAR CUTTER COMPANY

Tour No. 3 Buses leave from Statler and Sheraton and return to Statler and Sheraton. LIMIT 125 VISITORS. The plant provides a total of 50,000 sq. ft. devoted to the manufacture of special milling cutters. Such products as the accurate unground-form hob, Starbore gun drills, pressure-coolant reamers and other special items for the industry will be seen. (See pages 166, 167 for related Techtour sessions on "Gun Drilling." You must participate in these sessions, to attend this tour.)

1:00 P.M. CHRYSLER CORPORATION OF CANADA

Tour No. 4 Buses leave from Armory and return to Statler and Armory. LIMIT 100 VISITORS. Proof of citizenship required. Visitors will see one of the most complete composite automobile plants covering over 30 acres and containing over 7½ miles in conveyors. Visitors will see various models of the Valiant, Plymouth, Dodge, DeSoto, and Chrysler assembled on one production line in this one plant.

MONDAY, APRIL 25

8:30 A.M. OJIBWAY SALT MINES OF CANADA

Tour No. 5 Buses leave from Statler and return to Statler. LIMIT 100 VISITORS. Proof of citizenship required. The salt mine, located near Windsor, Ontario, Canada, is 1080 ft. underground. The mine occupies a 32 acre city of solid rock salt where the temperature is 60 deg. F. the year around. At the present production rate of 500 tons per hour, a 1,000,000 tons per year, this mine will last more than 100 years. Equipment is serviced in an underground machine shop. Material is handled by endless belts, which carry salt to the crushers.



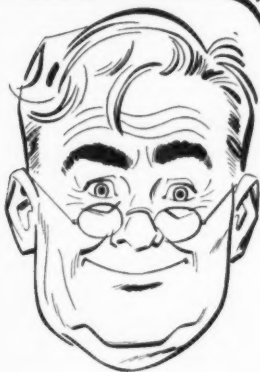
YOU CAN
"PRECISION TAP"
PRECISION HOLES
 ON THE

Hamilton

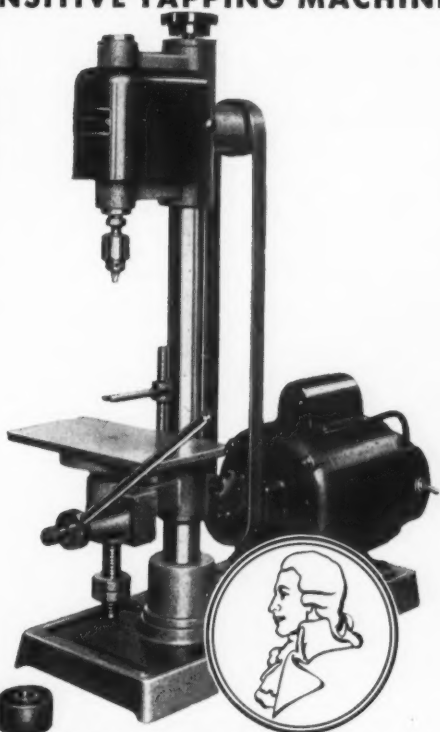
SUPER SENSITIVE TAPPING MACHINE

(000 - 120 to 10 - 24)

*"It masters
 the heart-break jobs"*



Ask for
FREE LITERATURE BATCH
No. T-821



THE HAMILTON TOOL COMPANY
828 SOUTH NINTH STREET • HAMILTON • OHIO

For more data circle 443 on Postpaid Card

ASTME Plant Tours . . .

8:30 A.M. DETROIT DIESEL ENGINE DIVISION, GENERAL MOTORS CORPORATION

Tour
No. 6

Buses leave from Statler and return to Statler. LIMIT 100 VISITORS. This plant produces Diesel engines with ratings from 20 to 1650 horsepower. The latest in modern equipment for the machining, assembling and testing of Diesel engines will be on display. Included will be the latest in transfer machines, designed for ultimate economy while producing parts for a wide variety of assemblies.

1:00 P.M. CHRYSLER CORPORATION (Trenton Engine Plant)

Tour
No. 7

Buses leave from Statler and return to Armory. LIMIT 100 VISITORS. Under one roof, covering 1,250,000 sq. ft., ten different engines are built to 159 modifications and assembled on only two lines. Latest developments in producing the inclined six cylinder engines that power the Dodge Dart and the Valiant cars will be seen.

TUESDAY, APRIL 26

8:30 A.M. FORD MOTOR COMPANY (Ford Rotunda and Tool and Die Building)

Tour
No. 8

Buses leave from Statler and return to Statler. LIMIT 100 VISITORS. The Tool and Die Plant contains 410,000 sq. ft. of floor space. The building is staffed with approximately 1500 journeymen and about 200 apprentices. Ford Rotunda is the largest permanent industrial exhibit building in America. Divided into four main sections, this display area depicts basic and applied research in the fields of chemistry, metallurgy and electronics, manufacturing methods, creative efforts which produced advanced products, styling, and engineering, and the automotive industry's contribution to the national life.

8:30 A.M. WILLOW RUN PLANT, CHEVROLET MOTOR DIVISION

Tour
No. 9

Buses leave from Statler and return to Statler. LIMIT 100 VISITORS. Visitors will see a complete new plant, equipped for the assembly of Corvair automobiles. Since the Corvair is the only domestic auto with the engine in the rear, development of new techniques in handling and assembling were required.

1:00 P.M. ARGUS CAMERA DIVISION, SYLVANIA CORPORATION

Tour
No. 10

Buses leave from Statler and return to Armory. LIMIT 100 VISITORS. One of the few photographic lens grinding, polishing, and centering facilities in the U. S., Argus is located in Ann Arbor. Argus lens grinding and polishing is measured in the millionths of an inch (yet lenses can reach top production rate of 18,000 per day). Tour will also include assembly line where Argus' famous C3 Camera is made. Visitors will have a chance to see themselves on Argus' brand new direct wire T.V. camera, which will be set up to illustrate industrial applications of the new T.V. system.

1:00 P.M. ENRICO FERMI ATOMIC ENERGY PLANT

Tour
No. 11

Buses leave from Statler and return to Armory. LIMIT 100 VISITORS. This breeder reactor power plant was built by Power Reactor Development Company, who own and operate the reactor. Detroit Edison Company is building a conventional electric generating section, adjacent to the reactor plant and will purchase steam from the PRDC to operate the 150,000 kilowatt turbine generator. Detroit Edison also operates an Atomic Center on the site.

NEW DUMORE[®]

high speed hand grinder

HIGHEST FULL-LOAD SPEED AVAILABLE

Ideal for carbide burs,
mounted wheels.

Balanced Power

—lower no-load
speed for longer
bearing life...
higher full-load
speed for maxi-
mum production,
faster metal
removal.



DUMORE Series 40 HAND GRINDER

Rating... ¼ hp, continuous duty
No-load speed... 35,000 rpm
Size... 10" long Weight... 3¼ lbs.
Collets... ¼" and ½"
Price... \$175, FOB Racine

Check the many outstanding,
exclusive features of this new
tool now... made by the
makers of famous Dumore
Hand Grinders, 9 models 1/20
to ¼ hp, priced from \$41.50,
FOB Racine... and Dumore
Flex-Shaft Tools, 4 models
1/20 to ¼ hp, priced from
\$40.00, FOB Racine.

**GET A FREE
DEMONSTRATION
NOW...**

at your local Dumore
Industrial Supply
Distributor



YOU CAN DO MORE WITH

DUMORE

ALL-PURPOSE PRECISION
METALWORKING TOOLS

VERSA-MIL • DRILL-N-TAP UNITS • DRILLING UNITS • DRILL
HEADS • MICRO-DRILLS • DRILL GRINDER • PRECISION
GRINDERS • HAND GRINDERS • FLEX-SHAFT TOOLS • QUILLS
AND ACCESSORIES

THE DUMORE COMPANY

1302 17th St., Racine, Wisconsin

For more data circle 444 on Postpaid Card

Try it at the ASTE Show, Detroit,
Booth 2249

April, 1960

MODERN MACHINE SHOP 179

ASTME Plant Tours . . .

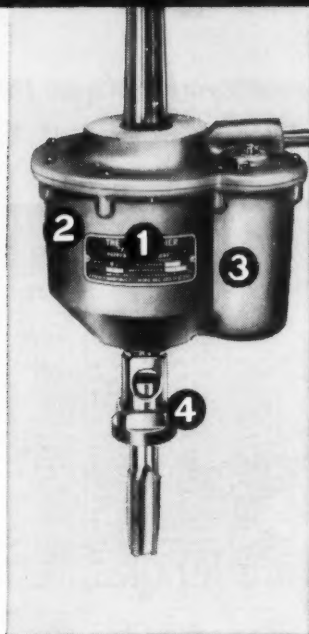
WEDNESDAY, APRIL 27

- 8:30 A.M. BURROUGHS CORPORATION (Plymouth Mfg. & Engrg. Division)**
Tour No. 12
Buses leave from Statler and return to Armory. LIMIT 100 VISITORS. Visitors will see unit manufacturing departments, assembly lines, wiring sections, shipping dock, powdered metal department, plastic department, and commercial inspection. This plant employs a unit manufacturing theory, whereby sub-units are completely built in individual departments and transported to the assembly line and installed in one operation.
- 8:30 A.M. CHRYSLER CORPORATION, Engine Division (Mound Road Plant)**
Tour No. 13
Buses leave from Statler and return to Armory. LIMIT 100 VISITORS. The V8 Engine Plant is internationally acclaimed to be one of the most modern and compact engine plants in the world. It occupies 500,000 sq. ft. of floor area, producing 150 engines per hour and contains automatic equipment found nowhere else in the industry. Outstanding is the assembly line and complete automatic engine testing.
- 1:00 P.M. GENERAL MOTORS TECHNICAL CENTER**
Tour No. 14
Buses leave from Armory and return to Armory and Statler. LIMIT 100 VISITORS. Internationally known, it is one of the largest technical centers in the world with outstanding examples of modern architecture and the ultimate in equipment. A guide will board each bus to describe the facilities and stops will be made at several of the lobbies to examine exhibits. The entire group will assemble in the Process Development Section auditorium to view a film of the latest developments of interest to tool engineers. CAMERAS WELCOMED.
- 1:00 P.M. FORD MOTOR COMPANY (Sterling Plant) Transmission and Chassis Division**
Tour No. 15
Buses leave from Armory and return to Armory and Statler. LIMIT 100 VISITORS. Visitors will see the largest number of gear cutting machines assembled under one roof, as well as the axle housing tube mill which forms thousands of feet of seamless tubing from coiled sheet steel. A large number of automatic transfer presses, utilizing progressive dies which draw and completely form various components of rear axles and front suspensions will be seen. Sure to be of interest to tool engineers will be the automated front suspension assembly lines and multitude of automatic transfer machines.

THURSDAY, APRIL 28

- 8:30 A.M.-12:00 NOON—OJIBWAY SALT MINES OF CANADA**
Tour No. 16
This is a repeat of Tour No. 5. Buses leave from Statler and return to Armory.
- 8:30 A.M. GREAT LAKES STEEL COMPANY (Division of National Steel Corporation)**
Tour No. 17
Buses leave from Statler and return to Armory. LIMIT 50 VISITORS. Great Lakes Steel has a plant area of 538 acres with 103 acres under roof, 49 miles of railroad track and a capacity of 3,200,000 tons of steel per year. Among other things, visitors will see 50,000 pound ingots reduced to 6 inch slabs, which in turn are hot rolled to a 90 inch wide sheet.

POWER



... FOR LARGE HOLE TAPPING!

- ① Extra 17 tooth spline drive for extra power
- ② Double cone friction clutch for sensitive finger tip control
- ③ Helical gear means smoother operation under heavy strains
- ④ Exclusive "Tru-Grip" tap holder for "close-to-wall" work

The New Procunier Tap King represents a major advancement in large hole tapping units. Powerful, dependable, it can tap in steel up to $1\frac{1}{4}$ " thick—and hold a class 2 fit with ease! It combines heavy duty ruggedness with delicate precision, to give you the best all 'round BIG tapper for BIG jobs! Operators like its super-sensitive action—management appreciates the many cost-saving features—including longer tap life, consistently uniform threads, fewer spoiled pieces. It always turns out more, higher quality work in less time, with less effort. Where cost counts and precision is paramount—the TAP KING is the tapper for you!



Write for FREE Brochures

Get the whole story on this remarkable unit. See the amazing production records that are being continually repeated in plants of every size, everywhere. Also details on the new Lead Screw Unit.

**PROCUNIER
SAFETY CHUCK CO.**

12 S. Clinton St., Dept. 4, Chicago 6, Ill.

Procunier Safety Chuck Co.

12 S. Clinton, Dept. 4, Chicago 6, Ill.

Gentlemen: Please rush me your 2 brochures.

Name.....

Company.....

Address.....

City..... Zone..... State.....

For more data circle 445 on Postpaid Card

Floor of Huge Detroit

**Showing booth numbers of the various
1960 American Society of Tool and**

2208	2108	2008	1909	1809	1708	1505	1405	1306	1305	1209	1208	1207	1206	1205	1204	1203	1202	1201	1200	1199	1198	1197	1196	1195	1194	1193	1192	1191	1190	1189	1188	1187	1186	1185	1184	1183	1182	1181	1180	1179	1178	1177	1176	1175	1174	1173	1172	1171	1170	1169	1168	1167	1166	1165	1164	1163	1162	1161	1160	1159	1158	1157	1156	1155	1154	1153	1152	1151	1150	1149	1148	1147	1146	1145	1144	1143	1142	1141	1140	1139	1138	1137	1136	1135	1134	1133	1132	1131	1130	1129	1128	1127	1126	1125	1124	1123	1122	1121	1120	1119	1118	1117	1116	1115	1114	1113	1112	1111	1110	1109	1108	1107	1106	1105	1104	1103	1102	1101	1100	1099	1098	1097	1096	1095	1094	1093	1092	1091	1090	1089	1088	1087	1086	1085	1084	1083	1082	1081	1080	1079	1078	1077	1076	1075	1074	1073	1072	1071	1070	1069	1068	1067	1066	1065	1064	1063	1062	1061	1060	1059	1058	1057	1056	1055	1054	1053	1052	1051	1050	1049	1048	1047	1046	1045	1044	1043	1042	1041	1040	1039	1038	1037	1036	1035	1034	1033	1032	1031	1030	1029	1028	1027	1026	1025	1024	1023	1022	1021	1020	1019	1018	1017	1016	1015	1014	1013	1012	1011	1010	1009	1008	1007	1006	1005	1004	1003	1002	1001	1000	999	998	997	996	995	994	993	992	991	990	989	988	987	986	985	984	983	982	981	980	979	978	977	976	975	974	973	972	971	970	969	968	967	966	965	964	963	962	961	960	959	958	957	956	955	954	953	952	951	950	949	948	947	946	945	944	943	942	941	940	939	938	937	936	935	934	933	932	931	930	929	928	927	926	925	924	923	922	921	920	919	918	917	916	915	914	913	912	911	910	909	908	907	906	905	904	903	902	901	900	899	898	897	896	895	894	893	892	891	890	889	888	887	886	885	884	883	882	881	880	879	878	877	876	875	874	873	872	871	870	869	868	867	866	865	864	863	862	861	860	859	858	857	856	855	854	853	852	851	850	849	848	847	846	845	844	843	842	841	840	839	838	837	836	835	834	833	832	831	830	829	828	827	826	825	824	823	822	821	820	819	818	817	816	815	814	813	812	811	810	809	808	807	806	805	804	803	802	801	800	799	798	797	796	795	794	793	792	791	790	789	788	787	786	785	784	783	782	781	780	779	778	777	776	775	774	773	772	771	770	769	768	767	766	765	764	763	762	761	760	759	758	757	756	755	754	753	752	751	750	749	748	747	746	745	744	743	742	741	740	739	738	737	736	735	734	733	732	731	730	729	728	727	726	725	724	723	722	721	720	719	718	717	716	715	714	713	712	711	710	709	708	707	706	705	704	703	702	701	700	699	698	697	696	695	694	693	692	691	690	689	688	687	686	685	684	683	682	681	680	679	678	677	676	675	674	673	672	671	670	669	668	667	666	665	664	663	662	661	660	659	658	657	656	655	654	653	652	651	650	649	648	647	646	645	644	643	642	641	640	639	638	637	636	635	634	633	632	631	630	629	628	627	626	625	624	623	622	621	620	619	618	617	616	615	614	613	612	611	610	609	608	607	606	605	604	603	602	601	600	599	598	597	596	595	594	593	592	591	590	589	588	587	586	585	584	583	582	581	580	579	578	577	576	575	574	573	572	571	570	569	568	567	566	565	564	563	562	561	560	559	558	557	556	555	554	553	552	551	550	549	548	547	546	545	544	543	542	541	540	539	538	537	536	535	534	533	532	531	530	529	528	527	526	525	524	523	522	521	520	519	518	517	516	515	514	513	512	511	510	509	508	507	506	505	504	503	502	501	500	499	498	497	496	495	494	493	492	491	490	489	488	487	486	485	484	483	482	481	480	479	478	477	476	475	474	473	472	471	470	469	468	467	466	465	464	463	462	461	460	459	458	457	456	455	454	453	452	451	450	449	448	447	446	445	444	443	442	441	440	439	438	437	436	435	434	433	432	431	430	429	428	427	426	425	424	423	422	421	420	419	418	417	416	415	414	413	412	411	410	409	408	407	406	405	404	403	402	401	400	399	398	397	396	395	394	393	392	391	390	389	388	387	386	385	384	383	382	381	380	379	378	377	376	375	374	373	372	371	370	369	368	367	366	365	364	363	362	361	360	359	358	357	356	355	354	353	352	351	350	349	348	347	346	345	344	343	342	341	340	339	338	337	336	335	334	333	332	331	330	329	328	327	326	325	324	323	322	321	320	319	318	317	316	315	314	313	312	311	310	309	308	307	306	305	304	303	302	301	300	299	298	297	296	295	294	293	292	291	290	289	288	287	286	285	284	283	282	281	280	279	278	277	276	275	274	273	272	271	270	269	268	267	266	265	264	263	262	261	260	259	258	257	256	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240	239	238	237	236	235	234	233	232	231	230	229	228	227	226	225	224	223	222	221	220	219	218	217	216	215	214	213	212	211	210	209	208	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	---	---	---	---	---	---	---	---	---	---

Plan

Artillery Armory



companies displaying products at the
Manufacturing Engineers' Tool Show.

1001 900		ENTRANCE AND REGISTRATION		600	500	400	301	300		
1000		1004		505	504	405 407 409 411	305	304 306		
1009		905		604	515	415	412	314 320		
1017 1021		913 917 921 927		527	526	427	317 321 323 327	115		
1027		1026		614	626	526	416 420 426	127		
1109		1030						227		
1127		1031 1034						326		
1131		1032 1034						131 135		
1139		1035 1036						139 147		
1155		1037 1038						151 155		
		1039 1040						161		
		1041 1042						165		
		1043 1044						169		
		1045 1046						173		
		1047 1048						177		
		1049 1050						181		
		1051 1052						185		
		1053 1054						189		
		1055 1056						193		
		1057 1058						197		
		1059 1060						201		
		1061 1062						205		
		1063 1064						209		
		1065 1066						213		
		1067 1068						217		
		1069 1070						221		
		1071 1072						225		
		1073 1074						229		
		1075 1076						233		
		1077 1078						237		
		1079 1080						241		
		1081 1082						245		
		1083 1084						249		
		1085 1086						253		
		1087 1088						257		
		1089 1090						261		
		1091 1092						265		
		1093 1094						269		
		1095 1096						273		
		1097 1098						277		
		1099 1100						281		
		1101 1102						285		
		1103 1104						289		
		1105 1106						293		
		1107 1108						297		
		1109 1110						301		
		1111 1112						305		
		1113 1114						309		
		1115 1116						313		
		1117 1118						317		
		1119 1120						321		
		1121 1122						325		
		1123 1124						329		
		1125 1126						333		
		1127 1128						337		
		1129 1130						341		
		1131 1132						345		
		1133 1134						349		
		1135 1136						353		
		1137 1138						357		
		1139 1140						361		
		1141 1142						365		
		1143 1144						369		
		1145 1146						373		
		1147 1148						377		
		1149 1150						381		
		1151 1152						385		
		1153 1154						389		
		1155 1156						393		
		1157 1158						397		
		1159 1160						401		
		1161 1162						405		
		1163 1164						409		
		1165 1166						413		
		1167 1168						417		
		1169 1170						421		
		1171 1172						425		
		1173 1174						429		
		1175 1176						433		
		1177 1178						437		
		1179 1180						441		
		1181 1182						445		
		1183 1184						449		
		1185 1186						453		
		1187 1188						457		
		1189 1190						461		
		1191 1192						465		
		1193 1194						469		
		1195 1196						473		
		1197 1198						477		
		1199 1200						481		
		1201 1202						485		
		1203 1204						489		
		1205 1206						493		
		1207 1208						497		
		1209 1210						501		
		1211 1212						505		
		1213 1214						509		
		1215 1216						513		
		1217 1218						517		
		1219 1220						521		
		1221 1222						525		
		1223 1224						529		
		1225 1226						533		
		1227 1228						537		
		1229 1230						541		
		1231 1232						545		
		1233 1234						549		
		1235 1236						553		
		1237 1238						557		
		1239 1240						561		
		1241 1242						565		
		1243 1244						569		
		1245 1246						573		
		1247 1248						577		
		1249 1250						581		
		1251 1252						585		
		1253 1254						589		
		1255 1256						593		
		1257 1258						597		
		1259 1260						601		
		1261 1262						605		
		1263 1264						609		
		1265 1266						613		
		1267 1268						617		
		1269 1270						621		
		1271 1272						625		
		1273 1274						629		
		1275 1276						633		
		1277 1278						637		
		1279 1280						641		
		1281 1282						645		
		1283 1284						649		
		1285 1286						653		
		1287 1288						657		
		1289 1290						661		
		1291 1292						665		
		1293 1294						669		
		1295 1296						673		
		1297 1298						677		
		1299 1300						681		
		1301 1302						685		
		1303 1304						689		
		1305 1306						693		
		1307 1308						697		
		1309 1310						701		
		1311 1312						705		
		1313 1314						709		
		1315 1316						713		
		1317 1318						717		
		1319 1320						721		
		1321 1322						725		
		1323 1324						729		
		1325 1326						733		
		1327 1328						737		
		1329 1330						741		
		1331 1332						745		
		1333 1334						749		
		1335 1336						753		
		1337 1338						757		
		1339 1340						761		
		1341 1342						765		
		1343 1344						769		
		1345 1346						773		
		1347 1348						777		
		1349 1350						781		
		1351 1352						785		
		1353 1354						789		
		1355 1356						793		
		1357 1358						797		
		1359 1360						801		
		1361 1362						805		
		1363 1364						809		
		1365 1366						813		
		1367 1368						817		
		1369 1370						821		
		1371 1372						825		
		1373 1374						829		
		1375 1376						833		
		1377 1378						837		
		1379 1380						841		
		1381 1382						845		
		1383 1384						849		
		1385 1386						853		
		1387 1388						857		
		1389 1390						861		
		1391 1392						865		
		1393 1394						869		
		1395 1396						873		
		1397 1398						877		
		1399 1400						881		
		1401 1402						885		
		1403 1404						889		
		1405 1406						893		
		1407 1408						897		
		1409 1410						901		
		1411 1412						905		
		1413 1414						909		
		1415 1416						913		
		1417 1418						917		
		1419 1420						921		
		1421 1422						925		
		1423 1424						929		
		1425 1426						933		
		1427 1428						937		
		1429 1430						941		
		1431 1432						945		
		1433 1434						949		
		1435 1436						953		
		1437 1438						957		
		1439 1440						961		
		1441 1442						965		
		1443 1444						969		
		1445 1446						973		

List of Exhibitors

Company Name

Booth No.

Company Name

Booth No.

- A -

AA Gage Co.	460
Ace Drill Bushing Co.	1630
Ace Drill Corp.	865
Acoustica Association	1641
Adamas Carbide Corp.	920
Advance Products Corp.	1738
Aero Service Corp.	317
Aeroquip Corp.	847
Aget Mfg. Co.	1638
Airborne Instruments Lab.	2160
Airetool Mfg. Co.	1734
Alameda Gage Co.	739
Alina Corp.	1608
Allegheny Ludlum Steel Corp.	360
Alloy Steels, Inc.	1965
Almco, Queen Prod. Div.	1626
American Bechler Corp.	350
American Coldset Corp.	450
American Cystoscope Makers	635
American Drill Bushing Co.	1309
American Edelstaal, Inc.	2054
American Pullmax Co., Inc.	827
American Sealants Co.	1565
American Twist Drill Co.	842
Ames Co., B. C.	714
Ampco Metal, Inc.	826
Amplex Div., Chrysler Corp.	727
Anderson & Sons, Inc.	927
Annis Co., R. B.	719
Anocut Engineering Co.	400
Apprentice Training Program	2015
Armstrong Bros. Tool Co.	760
Aro Equipment Co.	1918
Ashcombe Co.	1417
Assoc. Machine Tool Corp.	1560
Atlas Press Co., Clausing Div.	1931
Atrax Co.	947
Austin Industrial Corp.	1850
Automation Devices, Inc.	527
Automotive T & D Mfrs.	2223A
AVCO R & D	860

- B -

B M T Mfg. Corp.	2227
Bachmann Co., Eric R.	1055
Barer Eng'g & Mach'y Co.	1527

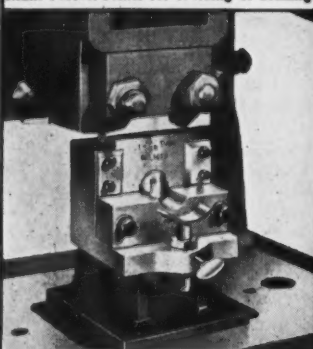
Barry Controls, Inc.	1420
Batchelder Engineering Co.	1460
Bausch & Lomb Optical Co.	630
Beaver Pipe Tools, Inc.	1416
Beaver Tool & Engineering Co.	806
Beckett-Harcum Co.	1637
Bellows Co., Valvair Div.	1109
Bendix-Westinghouse Automat.	1715
Bentley Industrial Corp.	1943
Besly-Welles Corp.	738
Bischoff Chemical Corp.	468
Blackhawk Mfg. Co.	1726
Black & Webster, Inc.	1408
Blake Co., Inc., Edward	1408
Bliss Co., E. W.	1034
Baggis Co., Henry P.	818
Bohle Machine Tools, Reinhard	2230
Boice-Crane Co.	744
Bokum Tool Co.	831
Borel & Dunner	1557
Branson Instruments, Inc.	165
Bridgeport Machines, Inc.	1231
Briney Mfg. Co.	1365
Bristol Co.	1631
Browne & Sharpe Mfg. Co.	1131
Buck Tool Co.	821
Buckeye Tools Corp.	1809
Burgmaster Corp.	734

- C -

Cadillac Stamp Co.	1405
Cadmet Corp.	111
Cammann Mfg. Co.	323
Campbell Machines Co.	134
Canadian Government Exh.	2161
Capital Reproductions Inc.	367
Carpenter Steel Co.	539
Carr Lane Mfg. Co.	246
Carter Controls, Inc.	1731
Case-Maul Mfg. Co.	1717
Cerro de Pasco Sales Corp.	1743
Challenge Machinery Co.	353
Champion Pneumatic Mach'y.	238
Chaso Tool Co.	1750
Chicago Pneumatic Tool Co.	1306
Chicago Rivet & Machine Co.	1845
Chi-Co Inc.	1650
Cincinnati Milling Machine Co.	504

Notch 12 PIPE ENDS per MINUTE

Make Perfect Joints for Welding or Brazing



ARC-FIT

REG. U.S. PAT. OFF.

**NOTCHES CLEAN
NO FINISHING
NO DEFORMATION**

Standard ARC-FIT in hand or power press shears contours for "T" joints for 1/2" to 2" pipe or tubing with easily interchangeable dies.

Special ARC-FITS for larger sizes, angles other than 90°, slotting or notching square pipes, angle iron or flat stock.

Send for Descriptive Literature

VOGEL

TOOL & DIE CORPORATION

1823 N. 32nd AVE., STONE PARK, ILL.



List of Exhibitors...

Company Name	Booth No.
Graham Machine Tool Co.	1442
Grant Mfg. & Machine Co.	1747
Graymills Corp.	1531
Green Instrument Co., Inc.	841
Greist Mfg. Co.	1546
Grob Inc.	438
Grobet File Co. of America	1238
Grotmes Machine Works, Inc.	1347
Gulf Oil Co.	453
Guthery Machine Tool Corp.	626

- H -

Hamco Machines, Inc.	855
Hammond Machinery Builders, Inc.	1027
Hanchett Magna-Lock Corp.	2126
Handy & Harman	1130
Hansen Mfg. Co.	2019
Hansford Mfg. Corp.	1765
Harco Engineering Co.	743
Harig Mfg. Corp.	1045
Harnischfeger Corp.	1930
Harrison & Sons Ltd., T. S.	2222
Hartford Special Machinery Co.	1723
Hause Machines, Inc.	943
Heli-Coil Corp.	955
Heller Tool Co.	2127
Herman Stone Co.	619
Hermes Machine Tool Co.	151
Hillyer Corp.	304
Hofmann Engineering Co.	2122
Hole Engineering Service	211
Homestrand, Inc.	2165
Houghton & Co., E. F.	135
Hovis Screwlock Co.	142
Hudson Automatic Machine & Tool Co.	2265
Hughes Aircraft-Industrial Systems	2117
Hunt Valve Co.	301
Huron Machine Products, Inc.	938
Hevi-Duty Electric Co.	1361
Hy-Du-Lignum Co.	1367
Hypneumat, Inc.	1639
Hydroway Scales, Inc.	2123
Hyprez Div., Engis Equipment Co.	1465

- I -

I.S.I. Mfg., Inc.	2051
Ideal Industries, Inc.	445
Index Machine Co.	1427
Indi-Square Co.	465
Industrial Diamond Association	430

For more data circle 446 on Postpaid Card



• **ALBRECHT**

The world's most accurate keyless drill chuck,
distributed in the United States and Canada by

Jacobs

and your Jacobs Chuck distributor

JACOBS MANUFACTURING COMPANY • WEST HARTFORD, CONNECTICUT



For more data circle 447 on Postpaid Card

April, 1960

MODERN MACHINE SHOP

187

List of Exhibitors...

Company Name	Booth No.	Company Name	Booth No.
Industrial Technics, Inc.	835	Kennametal, Inc.	1004
Ingersoll Milling Machine Co.	1708	Klingelhoefer Machine Tool Co., Al.	1860
Ingersoll-Rand Co.	1026	Koebel Diamond Tool Co.	1623
International Mach. Tool Co.	314	Kuzmick Co., Paul L.	1825
ISIS Inc.	160		

- J -

J & S Tool Co.	2116
Jarvis Corp.	131
Jarvis-Carbide Subsd.	1667
Jiffy Disintegrators, Inc.	2214
Jiffy Mfg. Co.	745
Johansson Co., I. O.	1435
Johansson Gage Co., C. E.	330
Johnson Gage Co.	331
Jones & Lamson Machine Co.	1208
Jones & Lamson Machine Co.	1217
Jr. Eng'g Technical Society	1967

- K -

Kalamazoo Tank & Silo Co.	300
Karniotis Precision Products	843

- L -

Lahr Machine & Tool Corp.	1821
Lake Erie Machinery Corp.	910
Lapeer Mfg. Co.	726
Last Word Sales Co.	114
Latrobe Steel Co.	442
Laurel Corp.	748
LeCount Tool Works	469
Lee Co., K. O.	1431
Leland-Gifford Co.	767
Lennox Tool & Machine Co.	846
Lincoln Industries Co.	2030
Link Div., General Precision Co.	2055
Littell Machine Co., F. J.	505
Littleford Bros., Inc.	747
Livernois Engineering Co.	905
Livingstone Co., John E.	109

FOR COST-CUTTING SPEED AND ACCURACY

					
Angle Plates	Slotted Angles	Box Parallels	Vee Blocks	Straight Edges	Aluminum Angles
					
Alum. Ht. Blocks	Boring Mill Parallels	Adj. Layout Angle Plates	Cylinder Squares	Scale Holders	Extension-Height Blocks

All of the precision accessories shown . . . and more, too . . . are immediately available in a wide range of standard sizes or in special sizes to specifications. Complete line of layout plates, floor plates, cast iron and black granite surface plates offered, too. Send for your FREE catalog today.

MACHINE PRODUCTS Corporation

6771 E. McNICHOLS ROAD • DETROIT 12, MICHIGAN

For more data circle 448 on Postpaid Card

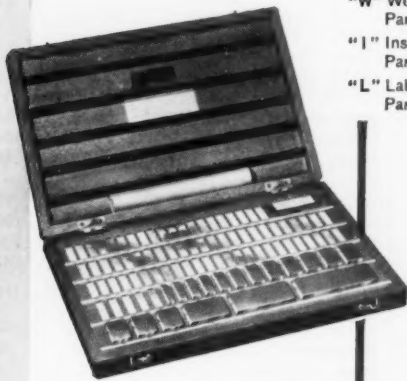
Longer wearing MILLIONTHS

Time you got acquainted with the world's first* and finest gage blocks. Blocks possessing correct temperature coefficient—absolute metallurgical stability. Blocks with a positive built-in wear factor—unconditionally guaranteed to be minus nothing from nominal size. Blocks, too, that feature chromium plated gaging surfaces to give you longer wearing millionths and lower gaging costs. Yes, it's time now to buy a set of



ELLSTROM CHROMIUM PLATED GAGE BLOCKS

MANUFACTURED AND CALIBRATED TO THE INTERNATIONAL INCH—EXACTLY EQUAL TO 25.4 MILLIMETERS



Above: Ellstrom Rectangular Set No. 92-R. Right: Ellstrom Square Set No. 81-SA, with accessories.

New Catalog contains prices and specifications—send for it today!

- "W" Working Accuracy: $\pm .000008''$ / $-.000000''$
Parallelism: $.000004''$ / Flatness: $.000004''$
- "I" Inspection Accuracy: $\pm .000004''$ / $-.000000''$
Parallelism: $.000003''$ / Flatness: $.000003''$
- "L" Laboratory Accuracy: $\pm .000002''$ / $-.000000''$
Parallelism: $.000001''$ / Flatness: $.000001''$



ELLSTROM STANDARDS DIVISION
22038 Beech Street



DEARBORN GAGE COMPANY
Dearborn, Michigan

Originators of Chromium Plated Gage Blocks



**Ellstrom—Measuring in millionths for three generations*

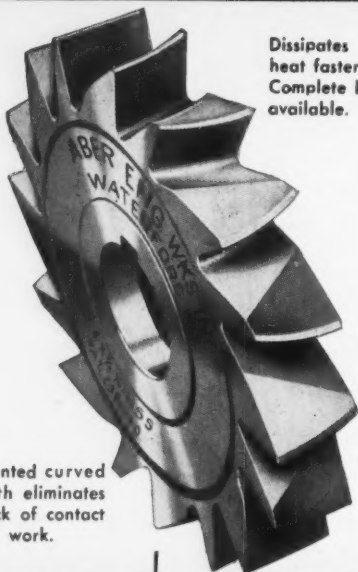
Hjalmar Ellstrom (1863-1942)—He gave mankind the key to mass production of interchangeable parts. For it was he alone who conceived and produced the world's first combination gage blocks—the first master reference standards accurate to the infinitesimal millionth part of an inch!

For more data circle 449 on Postpaid Card

Shearing Action

LONGER RUNS with

ABER Curved tooth CUTTERS



Dissipates heat faster. Complete line available.

Patented curved tooth eliminates shock of contact with work.

ABER Curved Tooth PLUS FEATURES

- Give More Accurate Control of Limits and Finish
- Elimination of Chatter and Breakage
- Extended Cutter Life

- Better Performance
- Increased Production

FREE DATA —
24 page catalog on milling with ABER Cutters.



ABER ENGINEERING WORKS

WATERFORD, WISCONSIN

For more data circle 450 on Postpaid Card

190 MODERN MACHINE SHOP

List of Exhibitors . . .

Company Name	Booth No.
Lodding, Inc.	2047
Logan Engineering Co.	1830
Logansport Machine Co.	1815
Lovejoy Tool Co.	334
Lufkin Rule Co.	730

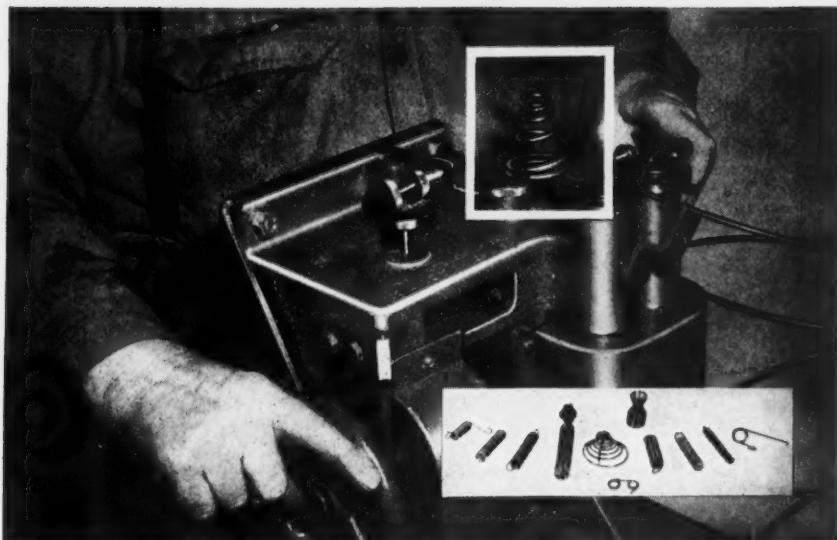
- M -

M & M Tool & Mfg. Co.	1265
M-B Products, Inc.	1735
M.B.I. Export & Import	1505
Machine Products Corp.	657
Madison Industries, Inc.	1826
Magnaflux Corp.	326
Mahr Gage Co.	130
Manufacturers Associates	2014
Marac Machinery Corp.	1919
Martin Engineering Co.	746
Martindale Electric Co.	856
Master Chemical Corp.	754
Master Mfg. Co.	2239
Master Power Corp.	2008
Matson Co., Inc.	1545
Matthews & Co., Jas. H.	627
Maxwell Industries, Inc.	1661
Mayes Tool Co.	568
Mayline Co., Inc.	426
McCrosky Tool Corp.	931
Mead Specialties Co.	951
Metal Carbides Corp.	2060
Metal Cutting Tools, Inc.	1644
Metallurgical Products, G.E.	1227
Michigan Mfrs. Service	1421
Micromatic Hone Corp.	1816
Micrometrical Mfg. Co.	305
Micro-Poise Engineering Co.	615
Miles, Inc., Ty	1756
Modern Devices	638
Modern Industrial Eng'g Co.	1818
Modern Machine Shop	750
Mohawk Tools, Inc.	327
Monroe Engineering Products	2021
Moore Products Co.	124
Moore Special Tool Co.	1105
Morrison Engineering Co.	1543
Morse Co., H. E.	561
Munn Engineering Co.	1548
Muskegon Tool Industries	921

- N -

National Acme Co.	1939
National Broach & Machine Co.	814

April, 1960



Any spring made fast in your shop! WITHOUT USE OF ARBORS

For a replacement or experimental spring, any shape, diameter or pitch from flat or round wire sizes .005" to .125", you can produce it in a matter of seconds with Perkins Precision Spring Coiler. You eliminate arbors, yet turn out precision springs — torsion, compression, extension, tapered, or special springs, coiled either left or right hand, in any desired length, any diameter from 3/32" to 12" and larger, with or without initial tension, and with

open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications as replacements or experimental work. Make them fast, right in your own shop!



PERKINS

MACHINE AND GEAR CO.

Special Machinery Division,
West Springfield, Mass.



Starrett adjustable jaw cut nippers (left) and Gardener Hook-Kon spring looping tool (center) — handy, precision, time-saving accessories for spring coiling. Perkins Spring Coiler available as bench model or power model shown here, (right) for tool shop or continuous runs.

Perkins Machine and Gear Co.
Special Machinery Division, Dept. D 2
W. Springfield, Mass.
Please send information and prices on
Perkins Spring Coiler.
Hand Model ☐ Power Model ☐

Name.....Title.....

Company.....

Address.....

City.....State.....

For more data circle 451 on Postpaid Card



KENTRALL Hardness Testers Are Motorized

By removing major test loads automatically, the new motorized Kentralls reduce operator error, increase reproducibility of test results, and raise the productive capacity of the machine—for the same price as hand operated testers.

The motorized Kentralls are available in Combination Testers which provide both Regular and Superficial Rockwell Hardness Testing in a single machine. For those applications that do not require the additional range, Kentrall also makes single purpose testers for either Regular or Superficial testing alone.

**For complete information write
for Bulletin CRS-60.**

KENTRALL
THE TORSION BALANCE COMPANY
Main Office and Factory:
CLIFTON, NEW JERSEY

Sales Offices: Chicago, San Francisco

TS-164

For more data circle 452 on Postpaid Card

List of Exhibitors...

Company Name	Booth No.
Nat'l Tool & Die Mfrs. Assoc.	2015
Neill & Co. (USA) Ltd., James	2219
Neise, Karl A.	1561
New Departure Div., GMC	1739
New England Machine & Tool Co.	2061
New Hermes Engraving Machine Co.	1555
Newage Industries Inc.	2240
Newton Hydraulic Tooling	1627
Nicholson File Co.	965
Nikon, Inc.	607
Noble & Westbrook Mfg. Co.	1446
Nobur Mfg. Co.	2235
Norgren Co., C. A.	720
North American Viking Drill Co.	1716
Northwestern Tools, Inc.	2218
Nupla Mfg. Co.	913

- O -

O. K. Tool Co.	567
Oakite Products, Inc.	930
Ohio Crankshaft Co.	1017
Olivetti Corp. of America	1660
Olsen Testing Machine Co., Tinius	2050
O'Neil-Irwin Mfg. Co.	805
Ortman-Miller Machine Co.	1808
Osborn Mfg. Co.	1305

- P -

Pangborn Corp.	2231
Park Chemical Co.	1655
Parker-Hannifin Corp.	1915
Payne Tool and Engineering Co.	1567
Perkins Machine Co.	1438
PIC Design Corp.	742
Pines Engineering Co.	1839
Pioneer Eng'g & Mfg. Co.	1443
Pivot Punch & Die Corp.	2026
Plan Hold Corp.	848
Portage Double Quick, Inc.	2226
Porter, Inc., H. K.	749
Porter Precision Products	942
Portman Instrument Co.	840
Portomag, Inc.	1642
Powermatic Machine Co.	2034
Precise Products Corp.	127
Precision Detroit Co.	661
Precision Tool & Mfg. Co.	1539
Preferred Industries, Inc.	751
Presin Co.	2053
Press Automation Systems	1720

LENOX ANNOUNCES MAJOR BAND SAW BLADE ADVANCEMENT!

The Lenox Master-Band triples the square inches of cutting per blade. Its positive cutting life is guaranteed to be at least three times longer than regular bands. A faster cutting rate is immediately visible. New cutting accomplishments can be made with standard band saw machine equipment. SEE COUPON BELOW for Guaranteed Trial Offer.

WE GUARANTEE that the new Lenox MASTER-BAND will definitely put new life and more versatility into your standard band saw machine. Master-Band will cut 50% faster . . . cut more square inches of metal . . . cut many of the tougher alloy steels on standard equipment . . . and we guarantee Master-Band will outlast at least *THREE* regular metal cutting bands.



THE MASTER-BAND IS SUPERIOR! The special steel analysis of Master-Band results in a

greater quantity of carbides in the structure. Processed through the Lenox modern, skillful heat-treating, Master-Band assures superior wear resistance, highly extended fatigue resistance, and continuous cutting of tougher steels at faster rates.

The Lenox TRUE-WELD process—using specifically designed equipment in welding Master-Band—guarantees the almost total elimination of weld breakage. Each blade is perfectly matched, electrically butt welded, and inspected to assure integrated bonding. Each weld is precision ground and inspected to prevent hollowing.

COST ADVANTAGES include: faster rate of cutting; less costly down-time; cutting tougher steels on standard equipment.

GUARANTEED TRIAL OFFER. Prove to yourself that the new MASTER-BAND modernizes your cutting operation and decreases costs. Fill out the coupon below and mail today. Or see your industrial distributor.



AMERICAN SAW & MFG. CO.
SPRINGFIELD, MASSACHUSETTS, U. S. A.

PLEASE FURNISH ALL INFORMATION REQUESTED,
COMPANY.....

ADDRESS..... (type or print)

(street & no.)

city

state

zip

IMPORTANT! PLEASE COMPLETE
MATERIALS AND SIZES CUT MOST

MAKE AND MODEL MACHINE
INDUSTRIAL DISTRIBUTOR.....

For more data circle 453 on Postpaid Card

Booth No.

Procunier Safety Chuck Co.	1714
Production Machine Co.	1922
Producto Machine Co.	1144
Products Supply Co.	2149
Pull-Gear Co.	2225
Punch Products Corp.	1742
Putnam Tool Co.	150

Rotherm Engineering Co.	1645
Rowe Machinery & Mfg. Co.	761
Royal Master Grinders	1616
Royal Oak Tool and Machine Co.	560

- 3 -

S-P Mfg. Corp.	1516
S & S Machinery Co.	2031
Sales Service Mach. Tool Co.	531
Salvo Tool & Engineering Co.	2045
Sandvik Steel, Inc.	227
Scharmann Machine Corp.	1914
Schauer Mfg. Corp.	838
Scherr-Tumico Co.	1330
Schmidt, Inc., Geo. T.	147
Schrader's Son, A.	1751
Schramm, Inc.	2143
Schwartz Precision Tool Sales	1656
Scully-Jones and Co.	1127
Seibert & Sons, Inc.	447
Selas Corp. of America	1001
Sentry Co.	2027

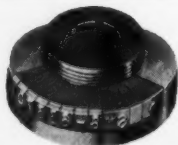
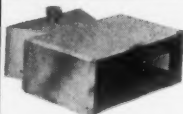
- R -

RCA Ind'l/Automation Div.	1961
Rahn Granite Surface Plate Co.	242
Reli-A-Check Corp.	1648
Reliant Gage & Supply Co.	1549
REM Sales Inc.	604
Ren Plastics, Inc.	1517
Rice Pump & Machine Co.	839
Richards Bros. Punch Div.	1814
Richards Co., J. A.	1061
Rockwell Mfg. Co., Delta Power Tool Div.	2046
Rockwell Mfg. Co., Walker-Turner Div.	2236
Ross Operating Valve Co.	1255
Rotor Tool Co.	1938

MARKING DIES



Matthews Press Stamping Dies are machined, engraved, and heat treated from a choice of over 50 grades of tool steel to provide the most suitable marking for your application.



Roller dies and Flat Roll dies provide the finest marking with the least effort. Precision engraving of correct side bevels provides stress free marking and long die life.



Holders and type for flat and roll marking designed with the same exactness are ideal where frequent changeover is required.

JAS. H. MATTHEWS & CO.
3962 FORBES AVENUE
PITTSBURGH 13, PA.

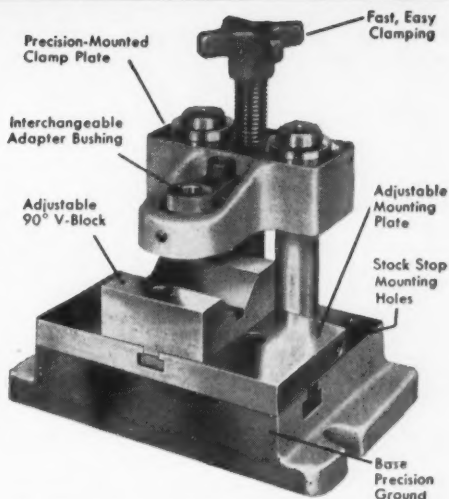
For more data circle 454 on Postpaid Card

REPCO *Time-Saving Tools*

ADJUSTABLE V-BLOCK DRILL JIG

**Saves Set-Up Time—
Increases Output**

Here is a versatile and accurate V-Block that makes center and off-center drilling, tapping, and reaming easy and precise. Four-way V-block adjustment simplifies handling a wide range of work. Fast, easy positioning and clamping speed production. A centering locator plug and T-slots in the mounting surface plates assure fast, easy, on-center adjustment. Drill capacity #80 to $\frac{3}{16}$ " diameter. Handles stock from $\frac{1}{4}$ " to 2" diameter.

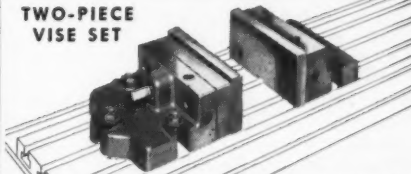


TRUE-CENTER ADJUSTABLE TOOL HOLDER



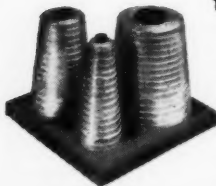
The REPCO Adjustable Holder is a precision-built tool, having two-piece construction which provides fast adjustment of the main body to compensate for as much as $\frac{1}{32}$ " machine misalignment. Cuts down on tool wear, breakage, and scrap.

TWO-PIECE VISE SET



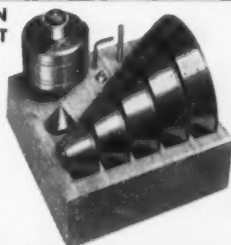
Save time with this versatile 2-Piece Machine Vise Set. Use as general-purpose vise, angle-block, or separate clamping device. Opening limited only to length of machine base. Light, accurate, rigid. Two sizes: 6" and 8".

CHUCK JAW TRUING-RING SET



This Ring Set saves time, cuts cost of boring jaws. With correct diameter rings at hand, you gain hours of productive time. Fluted rings range from 1" to 4" by $\frac{1}{4}$ " increments. Handy peg-type rack keeps rings in place.

COMBINATION LIVE-CENTER SET



Heavy-duty live center plus six interchangeable adapters, ranging from a point to $\frac{6}{16}$ " dia. bell. Saves costly set-up and machining time necessary to make large-diameter centers. Straight and various taper shanks available.

Write for complete information—Exclusive agent territories open.



ROCKFORD ENGINEERED PRODUCTS CO.

23rd Ave. & 20th St., Rockford, Illinois

For more data circle 455 on Postpaid Card

Company Name	Booth No.	Company Name	Booth No.
Service Diamond Tool Co.	321	Swanson-Erie Corp.	146
Service Machine Co.	1722	Sykes Machine & Gear Corp.	115
Severance Tool Industries, Inc.	320	Sylvania Lighting Products	1615
Sheffield Corp.	405		
Sheffield Corp.	500	- T -	
Sheldon Machine Co., Inc.	1727	Taylor-Winfield Corp. ...	1409
Stanley Sheppard	1842	Texaco, Inc.	960
Sieburg Industries, Inc.	2121	Thompson Mfg. Co., Earl A.	1060
Siewek Tool Co.	667	Thomson Industries, Inc.	1550
Simonds Abrasive Co.	631	Thor Power Tool Co.	1948
Simonds Saw & Steel Co.	631	Thread-All Sales Co.	2114
Simplicity Engineering Co.	2215	Threadwell Tap and Die Co.	2154
Sintercast Div., Chromalloy	110	Tomkins-Johnson Co.	1327
Size Control Co.	238	Torit Mfg. Co.	736
Skinner Chuck Co.	1338	Trabon Engineering Corp.	939
Socony Mobil Oil Co.	707	Tracer Control Co.	2220
Special Engineering Service	1454	True-Trace Sales Corp.	1831
Speedline	1766	Twentieth Century Mfg. Co.	639
Spiral Carbide Tool Co.	1654		
Spitfire Tool and Machine Co.	552	- U -	
Standard Electrical Tool Co.	1430	U. S.-Burke Machine Tool Co.	1909
Standard Parts Co.	966	U. S. Tool Co., Inc.	1520
Standard Pressed Steel Co.	515	Uddeholm Co. of America	548
Standard Tool & Mfg. Co.	1838	Union Mfg. Co.	961
Stanley Electric Tools	2115	Union Twist Drill Co.	1927
Star Cutter Co.	1508	United States Gypsum Co.	1451
Starlite Industries Inc.	1866	Universal-Automatic Corp.	1761
Starrett Co., L. S.	600	Universal Engineering Co.	614
Steco Corp.	2023	Univertical Foundry & Machine Co.	365
Steel City Testing Machines	1526	Upton Braden & James, Inc.	161
Stewart-Warner Corp.	1535		
Stimpson Co. Inc., Edwin B.	530	- V -	
Storch Products Co., Inc.	1865	V-B Mfg. Co.	224
Stupalox Div., Carborundum Co.	416	V.D.F. Div., Rudel Machinery Co.	131
Sunnen Products Co.	1155		
Superior Hone Corp.	1960		
Superior Steel Products Corp.	1439		
Supreme Products Corp.	917		



SPECIMEN

With DYKEM Steel Blue

Without DYKEM Steel Blue

DYKEM STEEL BLUE

Stops Losses.

making Dies and
Templates

Popular package
8-oz. can fitted
with Bakelite cap
holding soft-hair
brush for applying right
at bench; metal surface
ready for layout in a few min-
utes. The dark blue background
makes the scribed lines show up in
sharp relief, prevents metal glare.
Increases efficiency and accuracy.

Write for sample on company letterhead
THE DYKEM COMPANY
2301F North 11th St. • St. Louis 6, Mo.

196 MODERN MACHINE SHOP

April, 1960

NOW high precision for every shop area



with
Cleveland's
**TRANSISTORIZED
INDICATOR
INDI-AC, Jr.**

The INDI-AC, Jr. embodies
most of the features of
the standard INDI-AC
electronic indicator

★ **OPERATES ANYWHERE**

Portable—4½ pounds—6" x 7" x 3½"
AC and permanent, chargeable,
battery operated
Unaffected by shop conditions

★ **NO MAINTENANCE PROBLEMS**

Exclusive PROTECTOR TIP*
No battery replacement
Long life transistors
No mechanical parts to wear

★ **USE FOR ANY GAGING PURPOSE**

3 scales—thousandths—tenths—millionths
Zeros and readings coincide on all scales
Reversible action gage head—Light Tip
Pressure

other
**CLEVELAND
PRECISION
INSTRUMENTS**

INDI-AC—Ultra-Precision Electronic
Height Gage

MICRO-AC—Electronic Micro-
Comparator

INDI-RON—Ultra-Precision
Roundness, Squareness and
Concentricity Gage

ROUGHNESS METER—For surface
finish measurement

PAR-AC—Electronic Production Gage

*Patent Applied For.

Ask for a demonstration and see why **CLEVELAND** Gages give you more.

Cleveland **INSTRUMENT COMPANY**

6220 East Schaaf Road

Cleveland 31, Ohio

For more data circle 457 on Postpaid Card

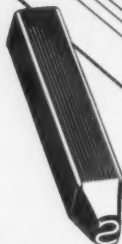


TO BE SURE OF
QUALITY
Remember
the Name

HOGGSON



**STEEL
STAMPS**



**CHAMFERED
CORNERS**
*for locating
the base*

**FINEST
STEEL**

*long
life*



**ALSO IN
REVERSE
FOR
MOLDS
& DIES**

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

HOGGSON & PETTIS MFG. CO.

New Haven 7, Connecticut

For more data circle 458 on Postpaid Card

198 MODERN MACHINE SHOP

List of Exhibitors . . .

Company Name	Booth No.
Valenite Metals	1209
Vanadium-Alloys Steel Co.	431
Van Keuren Co.	415
Vapor Blast Mfg. Co.	354
Vascoloy-Ramel Corp.	1030
Veet Industries	904
Vernon Devices, Inc.	946
Vidmar, Inc.	547
Viking Tool Co., Inc.	343
Vinco Corp.	565
Vlier Engineering Corp.	1426
Vulcan Tool Co.	1254

- W -

Waldes Kohinoor, Inc.	1861
Wales-Strippit, Inc.	1221
Walker Co., Inc., O. S.	2242
Walmet Corp.	2120
Warner & Swasey Research Corp.	1635
Watts Regulator Co.	2042
Webber Gage Co.	240
Wedin Corp.	2223
Weldon Tool Co.	439
Wells Mfg. Corp.	1551
Wespo Div., Vlier Eng'g Corp.	1317
Wheelabrator Corp.	861
Wheel Trueing Tool Co.	338
Whistler & Sons, Inc., S. B.	1339
Whiton Machine Co.	1434
Wickman Mfg. Co.	1139
Wilson-Carr Inc.	655
Wilson Mechanical Instrument Div.	715
Wilson, Inc., Thomas C.	1657
Wilton Tool Mfg. Co.	1754
Winslow Products Eng'g Corp.	1165
Wintriss, Inc.	844
Wisconsin Drill Head Co.	621
Wolverine Tool Co.	2043
Woodworth Co., N. A.	1351

- Z -

Zagar, Inc.	351
Zagar, Inc.	718
Zagar, Inc.	1653
Zeiss, Inc., Carl	1538
Zero-Max Co.	1447
Ziegler Tool Co., W. M.	1855
Ziv Steel & Wire Co.	2137

April, 1960

For best results
in Surface Grinding . . .
Always Use Blanchard Wheels!

The flexibility in application of your Blanchard Surface Grinder enables you to attain peak production at lowest cost on hundreds of different grinding jobs. *But, it is very important that you use the right wheel for each job!*

Blanchard makes and stocks a great variety of silicate, resinoid and vitrified bonded wheels and segments. Ask your Blanchard representative to help you select the wheel - or wheels - best suited to your requirements. Call or write him today. And may we send you a copy of "The Art of Blanchard Surface Grinding" (4th Edition)?

THE BLANCHARD MACHINE COMPANY
64 State Street,
Cambridge 39, Mass., U. S. A.



For more data circle 459 on Postpaid Card



Use Postpaid Cards opposite Page 32 and Inside Back Cover for requesting free copies of literature listed below.

Inclined Bed Lathe

Marton Equipment, Inc., 200 Rantoul St., Beverly, Mass. Color bulletin on Willson Mark One Inclined Bed Lathes. In addition to descriptive and illustrative material, information is given on a range of equipment that can be used with the lathe.

For more data circle 8 on Postpaid Card

Bar Automatics

Greenlee Brothers and Co., 1750 Mason Ave., Rockford, Ill. Catalog A-405 on Greenlee Bar Automatic for lead screw threading and tapping.

For more data circle 9 on Postpaid Card

Self-Cleaning Collet

Sheffer Collet Co., 18056 James Couzens Highway, Detroit, Mich. A 24 page catalog gives dimensions on the company's complete line of standard collets, pushers, pads and accessories.

For more data circle 10 on Postpaid Card

Saw Blades and Tools

Spartan Saw Works, Inc., Springfield 7, Mass. 16 page color brochure on hack saws, band saws, hack saw frames, hole saws, compass saws, tool bits and flat ground steel. Tables and data are included to help select the proper blade for metals and other materials and, also, the "how" of efficient cutting.

For more data circle 11 on Postpaid Card

Arbors and Adapters

J and S Tool Co., Inc., 871 Dorsa Ave., Livingston, N. J. New folder describes and illustrates J and S "No-Bend" Milling Machine Arbors and Adapters with live bearing supports. The hardened and ground arbors are interchangeable with 40 to 50 taper adapters, permitting more continuous use of milling machines and increased production.

For more data circle 12 on Postpaid Card

Chucking Machines

Hardinge Brothers, Inc., Elmira, N.Y. Bulletin HC-HCT gives complete information on Hardinge Precision Chucking Machines. Models HC-cfr and HCT-cfr are illustrated and described.

For more data circle 13 on Postpaid Card

Diamond Wheel Dressers

Bollier-Damerell, Inc., Niagara Cutter Division, 332 Niagara St., North Tonawanda, N. Y. Bulletin DW-160, Edition A, presents motorized diamond wheel dressers, which help to hold down diamond wheel replacement costs for carbide tool and die production and maintenance.

For more data circle 14 on Postpaid Card

Hack Sawing Machines

Peerless Machine Co., Racine, Wis. Bulletin No. 6500 describes the Speedy-Cut Power Hack Sawing Machines.

For more data circle 15 on Postpaid Card



LITERATURE

Collapsing Taps

Geometric-Horton, New Haven 15, Conn. Specifications and price information on Class "ST" semi-taper action collapsing taps, designed for producing smooth threads on especially tough materials.

For more data circle 16 on Postpaid Card

Elevating Table

Hamilton Tool Co., 828 South Ninth St., Hamilton, Ohio. Literature Batch No. P-800 provides data on the Portelvator, the handy portable elevating table, which will lift, lower, position and transport.

For more data circle 17 on Postpaid Card

Core Drills

Metal Cutting Tools, Inc., Rockford, Ill. Four page color bulletin on Metcut Pin-Mount Core Drills which provide 60 percent more space for chip removal.

For more data circle 18 on Postpaid Card

Knobs and Inserts

Northwestern Tools, Inc., 119 Hollier Ave., Dayton 3, Ohio. Catalog No. 30 includes all of the standard components that Northwestern manufactures, including new quick acting hand knobs and quick acting inserts.

For more data circle 19 on Postpaid Card

Optical Benches

Gaertner Scientific Corp., 1275 Wrightwood Ave., Chicago 14, Ill. Bulletin No. 156-59 contains 28 pages which describe the complete line of Gaertner Optical and Instrument Benches. The bulletin gives general features, descriptions and specifications for lathe bed type benches, double rod benches, single rod benches and accessories.

For more data circle 20 on Postpaid Card

Time-Saving Devices

Lassy Tool Co., Plainville, Conn. Catalog 1960 presents time-saving devices for production, inspection and the toolroom. Products include multi-purpose work-holders, tappers, tap and die guides, accessories for tapping and threading, master angle plates and sine bars. Included is a partial list of companies who have purchased Lassy Tools.

For more data circle 21 on Postpaid Card

Drilling Tool

Thor Power Tool Co., 175 North State St., Aurora, Ill. A handy 3 by 6 inch information folder provides specifications and operational details on the company's No. 15 DL dustless concrete and rock drilling hammer and companion dust extractor.

For more data circle 22 on Postpaid Card

Socket Head Cap Screws

Holo-Krome Screw Corp., Hartford 10, Conn. Form CSN is a complete engineering technical standard covering the new 1960 series of socket head cap screws. Format was designed especially for engineers. It can be readily reproduced on conventional blueprint machines.

For more data circle 23 on Postpaid Card

Coiling Machine

MacLodyne Corp., Curvit Division, 19 Grosvenor Ave., East Providence, R. I. Complete information on the versatile new Curvit C-155 Coiler with infinitely variable diameter control. The Curvit C-155 will coil pipe, tube, flat stock and solid bars, from $\frac{3}{4}$ to $2\frac{1}{2}$ inches in diameter. Production speed is variable from 15 to 30 feet per minute.

For more data circle 24 on Postpaid Card

Free Literature . . .

Cylinders, Boosters, Fittings

Flick-Reedy Corp., 7N023 York Road, Bensenville, Ill. Bulletin P2547P covers the products of the Miller Fluid Power and Tru-Seal Divisions of Flick-Reedy. Products include air and hydraulic cylinders, non-sag piston rods, high speed cushions, adjustable stroke cylinders, air-hydraulic boosters, air-oil circuits, and Tru-Seal Pipe Fittings.

For more data circle 25 on Postpaid Card

Numerical Control

Fosdick Machine Tool Co., Cincinnati 23, Ohio. Catalog PB-A provides data on Fomatic Numerical Control for its line of boring machines.

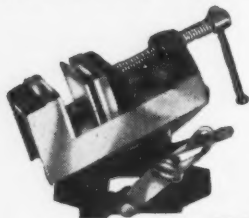
For more data circle 26 on Postpaid Card

Machine Tools

Giddings and Lewis Machine Tool Co., Fond du Lac, Wis. The complete line of currently standard Giddings and Lewis machine tools is described in a new condensed Catalog No. 60. Included are horizontal boring, drilling and milling machines and accessories; vertical turret lathes; vertical

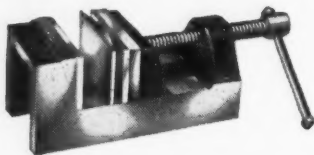
boring mills; up-right and radial drilling machines; planer mills; and planers. All machines are described as being available with punched tape, discrete positioning or magnetic tape continuous-path controls. For more data circle 27 on Postpaid Card

New Stanley-Yankee Vises cut costs at bench and machine



No. 4993A
Swivel-Tilt Vise
3" Jaws

No. 993A
Utility Vise
3" Jaws



New No. 4993A Swivel-Tilt Vise combines swivel base and angle base for quick compound angle set-ups. The exclusive dovetail slot in the vise permits adjustment the full length while retaining the swivel feature. Vise can be detached from swivel-tilt base quickly and easily.

New No. 993A Utility Vise with 3" Jaws—precision-built for machine shop use.

Vises and bases are available separately. Ask your industrial supply distributor for details, or write Stanley Tools, 9104 Elm St., New Britain, Connecticut.

Live Centers

Sturdimatic Tool Co., 3932 F St., Detroit 16, Mich. Four page catalog completely describes the company's live centers. Bulletin 160 gives specifications and new prices of the "standards," which are made with Morse taper, and includes three types of specials. More than 40 other specials are illustrated. These were engineered for some specific purpose metalworking operation.

For more data circle 28 on Postpaid Card

Automation

Cross Co., Box 3835, Detroit 5, Mich. Booklet entitled "Turning

STANLEY

The Tool Box of the World

For more data circle 460 on Postpaid Card

Scientific Engineering Developments to Practical Use" summarizes briefly the present state and some of the developments for the immediate future of Cross. For more data circle 29 on Postpaid Card

Application Manual

Cratex Manufacturing Co., Inc., 1600 Rollins Road, Burlingame, Calif. Cratex Application Manual for industrial use includes information concerning the many uses for rubberized abrasives, case histories on a variety of typical applications and a copy of the latest Cratex catalog. The most efficient methods for mounting, dressing and truing and recommended operating speeds are given in brief, but complete form.

For more data circle 30 on Postpaid Card

Abrasives

Weldon Roberts Rubber Co., Brightboy Industrial Division, 95 North 13th St., Newark 7, N. J. Information on the following: (1) list of job matched Brightboy grains and textures, (2) applications, machine speeds, (3) sample hand tablet and (4) nearest distributor.

For more data circle 31 on Postpaid Card

Recessing Tools

Nobur Manufacturing Co., 6860 Farmingdale Ave., North Hollywood, Calif. Four page brochure on the completely new Intramatic Tool for automatic back spotfacing, back countersinking, internal recessing and undercutting within a hole or bore.

For more data circle 32 on Postpaid Card

Bar-Billet Shear

Hill Acme Co., 1201 West 65th St., Cleveland 2, Ohio. Bulletin BB-59 on the Hill Acme Heavy Duty Bar-Billet Shear for production cutting of heavy billets.

For more data circle 33 on Postpaid Card

Precision Grinders

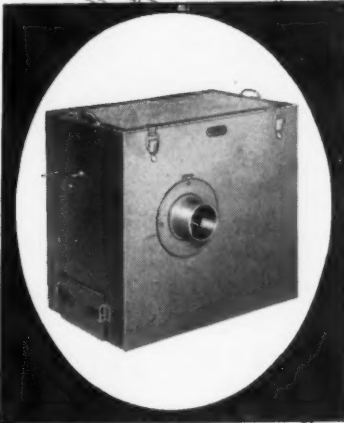
Covel Manufacturing Co., Benton Harbor, Mich. Bulletin M30 gives complete information on the 7A 6 by 12 inch hand feed surface grinder and the entire line of Covel Precision Grinders.

For more data circle 34 on Postpaid Card

DUSTKOP "520"

designed to collect dust from
single machines

portable —
easily installed



Self-contained Dustkop models, like the "520," are practical and effective in collecting dust from single machines. They're designed specifically for service with surface grinders, tool and cutter grinders, offhand

grinders, buffers and other small wheel equipment. These units are also easy to install — are actually portable — and very economical to operate.

Write for illustrated literature

46 models to choose from!

NEW DUSTKOP AUTO SHAKER
shakes filters AUTOMATICALLY

AGET manufacturing company ask for
details

1398 E. Church Street, Adrian, Michigan
For more data circle 461 on Postpaid Card

Free Literature . . .

Automatic Lathe

Gisholt Machine Co., Madison 10, Wis.
Full information on the Gisholt No. 24
Hydraulic Automatic Lathe.

For more data circle 35 on Postpaid Card

Numerically Controlled Machines

Ex-Cell-O Corp., Detroit 32, Mich. A
new Guide Book of numerically controlled
machine tools will help you
decide if you can use numerical control

in your machining operations. It is an
informative booklet of 20 pages, containing
basic information and approximate
costs of getting into tape controlled
operations.

For more data circle 36 on Postpaid Card

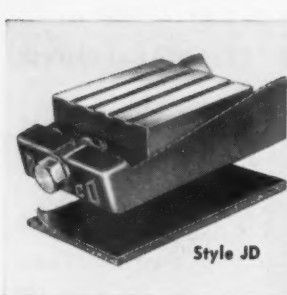
Rust Preventative

Corrosion Reaction Consultants, Inc.,
116 Chestnut St., Philadelphia 6, Pa. A
simple, economical way to prevent metal
corrosion is the subject of a new eight
page, two color catalog. It explains how
this liquid formula, known as CRC 3-36,
works, how it is applied, its duration of

effectiveness and
gives details of its
physical specifications.
This brochure includes a
number of CRC
3-36 applications to
illustrate the range
and versatility of
this preventative
and restorative.

For more data circle
37 on Postpaid Card

DEPENDABLE MACHINE SUPPORT!



Style JD



Style JS

With

EMPCO

LEVELING JACKS

For better machine performance
set your machines level and keep
them level! That's the key to in-
creased production with less
maintenance! EMPCO Leveling
Jacks provide a solid, adjustable
support for machine tools, large
surface plates, tool room, and
production equipment of
all types. Easily installed and
located, EMPCO Jacks keep
your equipment level and

stable—keep maintenance at a
minimum.

VI-SORB Mounting Pads, optional
with EMPCO Jacks, control vibration
from within the machine itself and
reduce transmitted vibrations. Available
in six styles and 25 models there's
a EMPCO Jack and VI-SORB
Mounting Pad for your every
machine leveling requirement!

WRITE TODAY FOR ILLUSTRATED BULLETIN AND PRICES!



THE ENTERPRISE MACHINE PARTS CORPORATION

2737 JEROME AVENUE • DETROIT 12, MICHIGAN

For more data circle 462 on Postpaid Card

Spring Coiler

Perkins Machine
and Gear Co., Special Machinery
Division, Department D1, West
Springfield, Mass. Information
and prices on the Perkins
Spring Coiler. Hand and power
models are available. With this
coiler it is possible to make any
type of spring, fast and exact,
without the use of arbors.

For more data circle
38 on Postpaid Card

Presses

L and J Press
Corp., 1624 Sterling
Ave., Elkhart, Ind. Catalog on the
L and J 50 Series Presses, which
are readily adaptable to a wide
variety of work.

For more data circle
39 on Postpaid Card

Sawing Machines and Blades

Armstrong-Blum Manufacturing Co., 5700 West Bloomingdale Ave., Chicago 39, Ill. Catalog C-85 has complete information on Marvel Hack Saws and Band Saws, Hack Saw Blades and Band Saw Blades.

For more data circle 40 on Postpaid Card

Optical Projection

Jones and Lamson Machine Co., Comparator Division, 521 Clinton St., Springfield, Vt. Bulletin discusses a new development in optical projection that overcomes the last obstacle to making full use of the optical comparator in Quality Pre-Control, which is an inspection technique. For more data circle 41 on Postpaid Card

Gage Blocks

DoAll Co., Des Plaines, Ill. New literature describes stainless steel gage blocks. This literature provides full information about the available sets, grades and prices. For more data circle 42 on Postpaid Card

Furnaces

Harper Electric Furnace Corp., 110 Pearl St., Buffalo 2, N. Y. Bulletin CT-1159 describes the modernized and expanded line of Harper Graphite Tube Furnaces for temperatures up to 5,000 degrees F.

For more data circle 43 on Postpaid Card

Nuts

National Machine Products Co., Utica, Mich. 12 page condensus of the company's 144 page catalog gives

all basic engineering data and specifications on hexagon nuts, sizes $\frac{1}{4}$ to 3 inches; 12 pointer nuts, sizes $\frac{1}{4}$ to $\frac{5}{8}$ inch; Conelock, Huglock and Marsden Locknuts, sizes $\frac{1}{4}$ to $1\frac{1}{2}$ inches.

For more data circle 44 on Postpaid Card

Punch Presses

Service Machine Co., 2310 West 78th St., Chicago 20, Ill. Four page color bulletin is a condensed catalog of Roussele Punch Presses, including double crank, o.b.l., deep throat, deep throat inclinable and horn types.

For more data circle 45 on Postpaid Card

Stocker & Yale Machine Tool Optical Projector



**OPENS A WHOLE
NEW DIMENSION
IN
PRECISION
PRODUCTION**

Vertical Projector on
Brown & Sharpe Grinder

Vertical or horizontal models.
Standard magnifications of 10X,
20X, 31.25X, 50X, 62.5X, 100X.
Measures in increments of .001"
or .0001"

Reduces costs — cuts machine downtime, saves operator time, speeds production, reduces scrap, speeds operator training. **Improves quality** — eliminates transfer errors, allows grinding to layout, permits seeing and measuring stock removal. **Broadens market** — allows you to do work you otherwise would not be able to do.

Readily attaches to most machine tools. Allows continuous and precise magnified checking, direct measurement, and comparison of work in process to transparent overlay charts. Gives a clear, sharp, high-contrast image . . . accurate, easy to see, easy to work with.

Portable. Easily converted from one application to another . . . or may be permanently mounted. Set-up time is merely a matter of minutes.

We guarantee the Model 7M will return more than your investment in short order!

STOCKER & YALE

Optical Projection Equipment — Lite-Mite Supplementary Lighting

Want ☐ Demonstration ☐ Optical Projection Methods Engineering
Details? ☐ Catalog on Machine Tool Projector Model 7M

Clip and attach to your letterhead. Sign and mail to:

STOCKER & YALE, INC., 50 Green Street, Marblehead, Mass.

For more data circle 463 on Postpaid Card

Free Literature . . .

Hydraulic Cylinders

Hannifin Co., Department 166, 565 South Wolf Road, Des Plaines, Ill. Bulletin Supplement S-113-1A covers the benefits derived from the use of straight thread cylinder ports. The supplement also contains a table for determining proper straight thread port sizes for 1½ through 8 inch bore cylinders and explains the advantages of using straight thread ports in hydraulic cylinders.

For more data circle 46 on Postpaid Card

Polishing Wheels

Nu-Matic Grinders, Inc., Catalog Department, 875 East 140th St., Cleveland 10, Ohio. Literature completely describes the company's expanded line of inflated polishing wheels and expanding polishing wheels, as well as sanding drums, belt sanders and expanding cones.

For more data circle 47 on Postpaid Card

Cutters and Arbors

Pratt and Whitney Co., Inc., 25 Charter Oak Boulevard, West Hartford, Conn. Four page color brochure on splined milling cutters and arbors, which are

ideal for all types of milling applications where heavy duty cutting is involved. The arbors were designed to speed production, improve accuracy, reduce tool costs per piece on normal milling operations and make it practical to perform milling cuts now impossible with conventional arbors.

For more data circle 48 on Postpaid Card



PRESSES

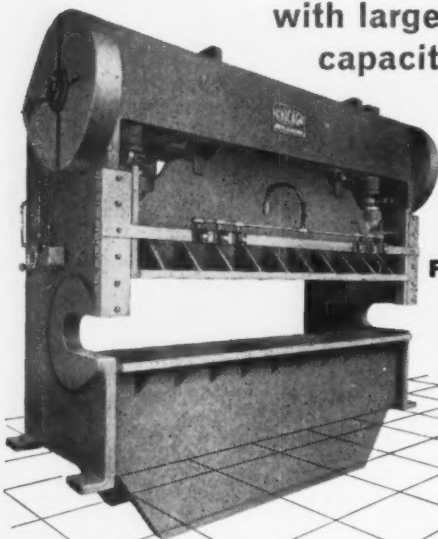
STRAIGHT-SIDE TYPE

with large die area
capacities up to
400 tons

AND

GAP
TYPE

PRESSES



6776

Complete recommendations for any job on request



Press Brakes • Straight-Side-Type Presses • Press Brake Dies

Hand and Power Bending Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

7418 South Loomis Boulevard, Chicago 36, Illinois

For more data circle 464 on Postpaid Card

Lathes

Lodge and Shipley Co., 3058 Colerain Ave., Cincinnati 25, Ohio. Bulletin HL-105 presents the Hi-Turn Copy-matic Lathe, which is extremely rugged and built to do production jobs at time and money saving rates.

For more data circle 49 on Postpaid Card

Adjustable Centers

Enco Manufacturing Co., Department 120, 4520 West Fullerton, Chicago 39, Ill. Flyer on Micro-Set Adjustable Centers, that end all center alignment problems.

For more data circle 50 on Postpaid Card

Marking Equipment

Pryor Marking Products, 434 South Wabash Ave., Chicago 5, Ill. Flyer on the Roll-A-Matic Printing Wheel, which uses quick setting interchangeable type. For more data circle 51 on Postpaid Card

Drill Press Feeds

Beckett-Harcum Co., Inc., 985 West Locust St., Wilmington, Ohio. Catalog No. F-60 illustrates, describes and gives detailed specifications on the company's line of drill press feeds and tapping and drilling machines.

For more data circle 52 on Postpaid Card

Chuck Actuator

PowerGrip, Inc., Rockfall, Conn. Flyer on the Gamet Hydraulic Chuck Actuator. Features, specifications and price information are given.

For more data circle 53 on Postpaid Card

Cut Off Machine

A. P. deSanno and Son, Inc., Phoenixville, Pa. Four page color bulletin on the Radiac Abrasive Cut Off Machine, Type "JOAH" Wet Cutting, for fast, accurate cutting of solids up to 4 inches round or square.

For more data circle 54 on Postpaid Card



Model
ER-830

Made to
U. S. Standards



ARBOGA

40" All-Geared RADIAL DRILL

Simplicity in design, low price and suitability for almost all drilling operations make the ARBOGA ER-830 a really outstanding tool. This 40" radial drill has a large working area. The radial arm has power elevation. Roller bearing column, coolant system and the exclusive Drill Ejector are standard.

Max. distance spindle to column:40"
Min. distance spindle to column:13 3/4"
Drilling capacity in steel:1 1/2"
Vertical travel of arm:26"
Diameter of column:8 3/8"
Spindle travel:6 7/8"
Spindle taper:#4
Motor size, H.P.:2.2/1.5

Let any one of over 100 dealers demonstrate for you this and other ARBOGA machines. Over 100,000 are in use now, many completing 25 years of trouble-free service.

Call any one of the numbers below or ask us for the name of your ARBOGA dealer. Illustrated brochure on request.

U. S. DISTRIBUTORS

Homestrand

MACHINE TOOL CORP.

392 West Putnam Avenue, Greenwich, Conn.

NEW YORK CHICAGO LOS ANGELES
203 Townsend 9-2558 Cliffside 4-7011 Angeles 3-7479

For more data circle 465 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 207

Free Literature . . .

Abrasive Belt Grinder

Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo, Mich. Bulletin 347-T on the Model 600-P 6 Inch Abrasive Belt Grinder.

For more data circle 55 on Postpaid Card

Photocopy Equipment

American Photocopy Equipment Co., 2114 West Dempster St., Evanston, Ill. New, 16 page booklet describes the

benefits of APECO photocopy equipment in a wide range of businesses. The full color booklet, entitled "The All Purpose Copymaker," explains to potential users the time and cost savings derived from photocopy use by small and large companies alike.

For more data circle 56 on Postpaid Card

Optical Squares

Engis Equipment Co., 431 South Dearborn St., Chicago 5, Ill. The effects of changes in Penta Prism position and alignment in optical tooling techniques is graphically described in a new 20

page booklet. The unique feature of the Penta Prism (optical square) is that regardless of whether a light beam enters exactly perpendicular to its face or at an angle, the beam emerges at a true 90 degree to its original path.

For more data circle 57 on Postpaid Card



STYLE AND SIZES FOR ALL MACHINES ON WHICH THREADS ARE CUT

This die head is unique

THERE IS NO OTHER LIKE IT

It cuts threads with insert chasers. These are, in reality, small sections of the business end of large and expensive chasers, but with this important difference: *their cost is so low they can be even thrown away when dull.* For example, for approximately \$50 you can get a dozen sets of insert chasers, each set ground ready to go. Change now to insert chaser die heads and watch your performance improve. "UNIFIED AND AMERICAN SCREW THREAD DIGEST" sent free on request.

THE EASTERN MACHINE SCREW CORP.

40-50 Barclay St., New Haven, Conn.

For more data circle 466 on Postpaid Card

Dieing Machines

Hydraulic Press Manufacturing Co., Mount Gilead, Ohio. Information on Henry and Wright Double Crank Dieing Machines.

For more data circle 58 on Postpaid Card

Shims

Laminated Shim Co., Inc., 3305 Union St., Glenbrook, Conn. Shim Design Folder No. 3 contains eight pages of up-to-date, well illustrated design information and specifications on custom - built shims, which are made of Laminum. These are solid shims that "peel" for adjustment.

For more data circle 59 on Postpaid Card

Flexible Shaft Equipment

Jarvis Corp., 101 Washington Park, North Attleboro, Mass. 34 page brochure covers flexible shafting, flexible shaft machines, handpieces and accessories. This literature describes light and heavy duty machinery, floor bench, overhead trolley and portable wheel types. This booklet should be of particular interest to foundries, shipyards, sheet metal shops or other industries where flexible machining is required.

For more data circle 60 on Postpaid Card

Machinists Vise

Cardinal Machine Co., 1819 Dana St., Glendale, Calif. Literature on the company's "Speed-Vise," which has been engineered for rugged bench work.

For more data circle 61 on Postpaid Card

Press Brakes

Niagara Machine and Tool Works, Buffalo 11, N.Y. Bulletin 89E contains 28 pages on enlarged, modernized Series N Press Brakes, 90 through 1,500 tons.

For more data circle 62 on Postpaid Card

One of these Wilson "Rockwell" instruments will do your hardness testing job

No matter what your hardness testing requirements are, there's a Wilson "Rockwell" tester to do the job. Choose from this complete selection of hardness testing equipment:

"Rockwell" Hardness Tester—for most hardness testing functions.

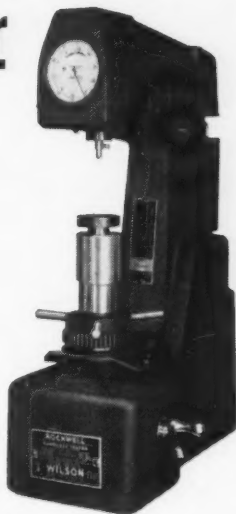
"Rockwell" Superficial Tester—for extremely shallow indentations.

TwinTester—Combines functions of "Rockwell" and "Rockwell" Superficial testers.

Semi and Fully Automatic—for high-speed testing, at rates up to 1,000 pieces per hour. Automatically classifies pieces as CORRECT, TOO HARD, or TOO SOFT.

Special Machines—for testing large objects, internal readings, and other unusual applications.

Diamond "Brale" Penetrators—Flawless diamonds, individually calibrated, and highest quality construction assure perfect testing every time.



Write for
Bulletin RT-58

WILSON "ROCKWELL" HARDNESS TESTERS

Wilson Mechanical Instrument Division
American Chain & Cable Company, Inc.

230-G Park Avenue, New York 17, New York

For more data circle 467 on Postpaid Card



Free Literature . . .

Milling and Die Sinking Machine

International Machine and Tool Corp., Post Office Box 3595, Cranston 10, R. I. Eight page color brochure on the Maho Universal Tool Milling and Die Sinking Machines. These machines, are fully described, illustrated and specifications are given, along with information on accessories for all models.

For more data circle 63 on Postpaid Card



NEW ROTOR *Airiter* gives world's fastest, easiest marking

There's nothing like the new Rotor *Airiter*! It marks anything...metal, plastic, glass, ceramic...parts or tools...as easy and fast as writing with a pen. No messy chemicals; no risky heat. Short-stroke carbide stylus makes up to 12,000 blows per minute. Speed and depth of mark easily controlled by throttle on tool. Will not stall while writing. Peening action...does not remove metal. Weighs only 5¼ ounces. Try it in your shop and see how it writes circles around other methods! Send us your purchase order. Money refunded if, after a five-day trial, the tool is unsatisfactory. *The Rotor Tool Company, 26325 Lakeland Blvd., Cleveland 32, Ohio.*

For more data circle 468 on Postpaid Card

Grinding Machines

Olivetti Corporation of America, Machine Tool Div., 42-33 Northern Boulevard, Long Island City, N. Y. 16 page brochure on mass production grinders. For more data circle 64 on Postpaid Card

Tap Selector

Hanson-Whitney Co., 269 Bartholomew Ave., Hartford 2, Conn. The correct taps for all purposes, regardless of the type of material, can now be ordered easily and accurately by catalog number with

this new Tap Selector. This method of specifying taps should prove of great help to all production and purchasing personnel, since the various charts indicate what stock taps are available for all classes of thread fit. The Tap Selector also includes a section on price and gage information.

For more data circle 65 on Postpaid Card

Lathes

Springfield Machine Tool Co., Springfield, Ohio. Bulletins 190-G and 201-G describe Springfield Engine and Toolroom Lathes.

For more data circle 66 on Postpaid Card

Recessing Tool

Madison Industries, Inc., Post Office Box 1137, Providence, R. I. Four page color bulletin on the Madison Automatic Recessing Tool that will cut recess to exact depth, width and position in one operation and complete recessing jobs in from three to seven seconds.

For more data circle 67 on Postpaid Card

Only \$49⁵⁰

plus postage

**DEALERSHIPS
AVAILABLE**

Grinding Wheels

Blanchard Machine Co., 64 State St., Cambridge 39, Mass. "The Art of Blanchard Surface Grinding," Fourth Edition, provides data on surface grinders, grinding wheels and segments. For more data circle 68 on Postpaid Card

Dry Abrasive Cutter

American Chain and Cable Co., Inc., Allison-Campbell Division, 931 Connecticut Ave., Bridgeport 2, Conn. Well documented, four page folder (Bulletin DH-299) describes the Model 2-A Sever-All Dry Abrasive Cutting Machine. Specifications, such as rated capacity, power required, cutting wheel diameter, dimensions and weights, are listed. Optional accessories are included. For more data circle 69 on Postpaid Card

Grinder

Michigan Tool Co., 7171 East McNichols Road, Detroit 12, Mich. Preliminary Technical Bulletin No. DCG-1 covers a new deburring and chamfering grinder for spur, helical and bevel gears. The machine simultaneously deburrs and chamfers the entire contour of both ends of the teeth of gears.

For more data circle 70 on Postpaid Card

Welding Data

Ampco Metal, Inc., Box 2004, Milwaukee 1, Wis. Highly informative, colorful wall chart contains data of value to users of resistance welding electrodes and accessories. Request Wall Chart RW-5. For more data circle 71 on Postpaid Card

Presses

American Brake Shoe Co., Denison Engineering Division, 1254 Dublin Road, Columbus 16, Ohio. Bulletin No. 120 is a 24 page, two color brochure which describes the versatility of the Denison Multipress, with special emphasis on new models. It is illustrated with actual case history pictures and describes various Multipress applications. Cutaway and dimensional drawings show why the Multipress is capable of exact control of ram speeds, pressures, strokes and action.

For more data circle 72 on Postpaid Card

Sentry Hardened Tools

Stay Sharper Longer

There's no better "insurance" against costly, premature dulling of your high speed production tools than reliable Sentry hardening. Sentry's unique Diamond Block provides a truly neutral atmosphere that permits heat treating for maximum hardness without danger of scale or decarburization... keeps your production tools sharper longer.

Like a free demonstration? Send us your sample high speed steel tool and we'll Sentry harden it for you free of charge.

9-0



Sentry

TRADE MARK

ELECTRIC FURNACES

Request Catalog E-3. Write THE SENTRY CO., FOXBORO, MASS.
For more data circle 469 on Postpaid Card

NOW! ... NEW COMPLETE LINE OF B&S THRIFTMILLS® AT 20% SAVINGS!

20% Lower Initial Cost and Amazing Production Dividends—Puts End Mills in "Throw-Away" Tool Class

New, and money saving—the four flute, single end Thriftmill was introduced a year ago with resounding success. Now, an expanded line of two and four flute, single and double-end B&S Thriftmills is available to make the initial 20% savings possible on tools for practically all conventional end milling operations.

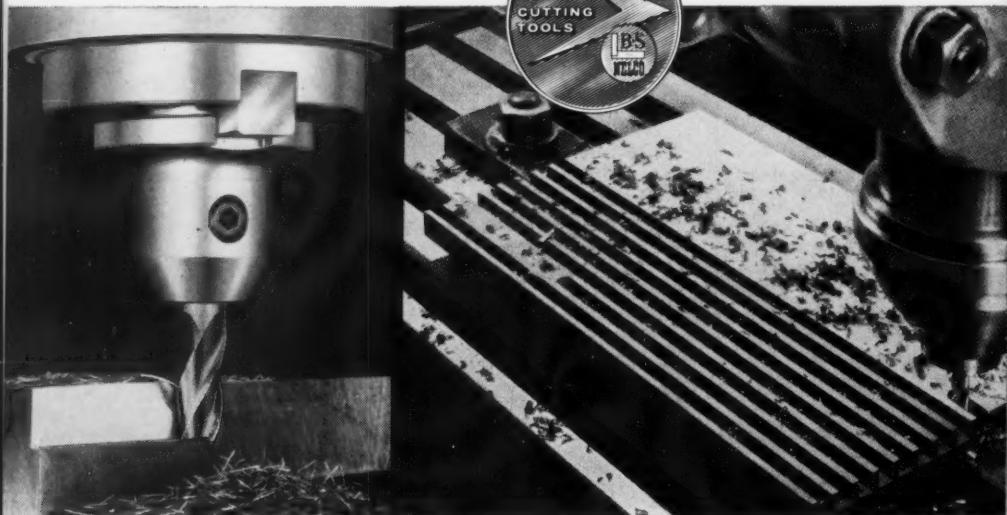
Shop tested for over a year on profiling, slotting, peripheral milling and many other general end milling operations, the new B&S Thriftmill has outperformed higher priced, competitive end mills. Superior microfinish on bottom and sides of slots, as well as on the periphery of profiling cuts, and more production before resharpening are only a few of the dividends this new B&S End Mill has added to the low, low initial Thriftmill cost.

WHY THE SUPERIOR B&S THRIFTMILL® COSTS LESS..

When most other metalworking costs are rising, why is the price of the Thriftmill lower?

The reason—it is a new exclusive design. Made in U.S.A., a product of B&S research and progressive engineering. Because of extreme simplicity of design, these End Mills can be produced faster, more efficiently and, therefore, cost less.

Demand for the four flute, single end Thriftmill was so phenomenal and the new tool's performance so excellent that large volume production has lowered manufacturing and distribution costs.



Thriftmill produces superior microfinish on tough alloy test piece. Note efficient chip formation.

Shop tests prove up to $3\frac{1}{2}$ times more production with New B&S Thriftmill

$\frac{1}{2}$ " Thriftmill cuts $\frac{5}{8}$ " slot in oil hardened tool steel, Rockwell C-18



SINGLE
END



DOUBLE
END

**TWO FLUTE • HELICAL FLUTE
STRAIGHT SHANK • For cutting most
conventional materials**

TOOL DESIGN—Two flute, 30° helix angle, 10° rake, right hand cut. Eccentric relief. Shank same diameter as cut.

TOLERANCES—Flute dia., + .000 — .005; Shank dia., + .0000 — .0005.

TOOL FEATURES—Ground from solid metallurgically tested high speed steel. Meets demanding production requirements with outstanding economy and lowest initial cost.

PRODUCTION USE—For virtually all conventional end milling operations, profiling, slotting and peripheral milling. This versatile tool can even be modified to plunge cut when necessary.

SIZES— $\frac{1}{8}$ ", $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ "; all "standard" from off-the-shelf stock.

**FOUR FLUTE • HELICAL FLUTE
STRAIGHT SHANK • For cutting most
conventional materials**

TOOL DESIGN—Four flute, 30° helix angle, 10° rake, right hand cut. Eccentric relief. Shank same diameter as cut.

TOLERANCES—Flute dia., + .000 — .005; Shank dia., + .0000 — .0005.

TOOL FEATURES—Ground from solid metallurgically tested high speed steel. Recommended for superior performance and lowest cost end milling on most conventional applications.

PRODUCTION USE—For profiling, slotting and peripheral milling.

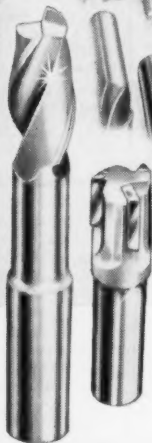
SIZES— $\frac{1}{8}$ ", $\frac{3}{16}$ ", $\frac{1}{4}$ ", $\frac{5}{16}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ "; all "standard" from off-the-shelf stock.



SINGLE
END



DOUBLE
END



**END
MILL
Headquarters!**

Twenty-four new high production, low cost Thriftmills added to the B&S end mill line brings the total of different off-the-shelf "standards" to nearly a thousand.

**For more data circle
470 on Postpaid Card**

End wonder, worry and wait... choose the right end mill for each specific job from the B&S "Condensalog". Write for yours today.

*For that **EXTRA** Edge in Production!*



Booth No. 1131

Brown & Sharpe

Cutting Tool Division
Brown & Sharpe Mfg. Co.
Providence 1, Rhode Island

Free Literature . . .

Four Slide Equipment

A. H. Nilson Machine Co., 627 Bridgeport Ave., Shelton, Conn. Nilson General Catalog presents the company's line of automatic four slide equipment.

For more data circle 73 on Postpaid Card

Radial Drill Press

Rockwell Manufacturing Co., Delta Power Tool Division, 606B North Lex-

ington Ave., Pittsburgh 8, Pa. Bulletin AD-1222 is a new, two color, photo-illustrated brochure that describes a radial press, which is a new drilling tool that can drill to the center or at any point on a 32 inch square.

For more data circle 74 on Postpaid Card

Surface Finish Measurement

Micrometrical Manufacturing Co., 345 South Main St., Ann Arbor 7, Mich. New two color bulletin describes the practical features and applications of the Profilometer. Packed with illustrations showing

a variety of Profilometer combinations for measuring the surface finish of almost any production surface, the bulletin shows typical applications in some well-known plants.

For more data circle 75 on Postpaid Card

Valves

Double A Products Co., Manchester, Mich. Data sheet describes a new hydraulic dual flow-control valve (Model YP-165). It contains valve drawing and descriptions and a parts list of this pipeless valve.

For more data circle 76 on Postpaid Card

Aluminum Alloys

Aluminum Company of America, 1501 Alcoa Building, Pittsburgh 19, Pa. Publication entitled "Aluminum Pig and Ingot" was compiled to aid foundries in selecting aluminum alloys for use in producing castings. Tables include data on which alloy to use for different methods of casting mechanical proper-



YOUR SPECIAL CUTTING TOOL PROBLEMS ARE SOLICITED.

You are welcome to our 25 years experience in designing and producing Special Cutting Tools.

Submit your problem—
with sample part, if feasible
OR we'll manufacture to
your specifications.

Thousands of
Severance SPECIAL CUTTERS
shipped monthly!

ASK FOR A QUOTATION TODAY!

			MIDGET MILLS 
			CHATTERLESS COUNTERSINKS 
			BALL SEAT REAMERS 
			CARBIDE END MILLS 
INSIDE DEBURRING CUTTERS 	OUTSIDE DEBURRING CUTTERS 	TUBE END DEBURRING CUTTERS 	CARBIDE HAND FILES 
HAND DEBURRING CUTTERS 	DISC CUTTERS 	DRILL COUNTERSINKS 	ELECTRODE DRESSING CUTTERS 
Severance TOOL INDUSTRIES INC. 724 IOWA AVENUE SAGINAW, MICHIGAN			REGRINDING SERVICE 

For more data circle 471 on Postpaid Card

ties of typical alloys, alloy composition limits and common uses of castings made from various alloys.

For more data circle 77 on Postpaid Card

Gages, Tapes, Calipers

L. S. Starrett Co., Athol, Mass. 48 page catalog illustrates and describes 88 new Starrett tools, including new Satin Chrome Tapes, Master Vernier Height Gages and Calipers, many new micrometer calipers, inside micrometers, micrometer depth gages, micrometer heads, Satin Chrome Combination Sets, protractors, dividers, trammels, Dial Master Indicators, dial bore gages and mechanics' tool chests.

For more data circle 78 on Postpaid Card

Dowel Pins

Producto Machine Co., 990 Housatonic Ave., Bridgeport 1, Conn. A new data sheet describes the company's Dowel Pin Assortment Kit. The kit contains ten each of 16 of the most often used dowel pin sizes, specially priced. Sizes range from $\frac{1}{8}$ inch long and $\frac{1}{8}$ inch in diameter to 2 inches long and $\frac{1}{2}$ inch in diameter.

For more data circle 79 on Postpaid Card

Drilling Machine

Motch and Merryweather Machinery Co., Avey Division, Box 1264, Cincinnati 1, Ohio. Informative literature on an automatic cycle drilling machine which features adjustable rapid power traverse, feed and rapid return of the spindle.

For more data circle 80 on Postpaid Card

Metallizing Equipment

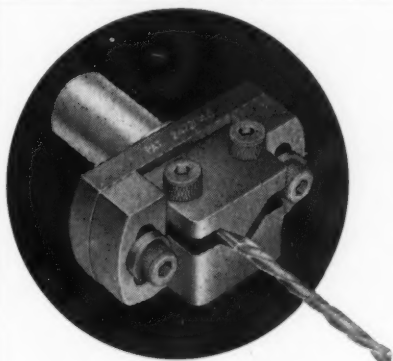
Metallizing Engineering Co., Inc., 1177 Prospect Ave., Westbury, Long Island, N.Y. Detailed information on how a metallizing installation can pay for itself in a very short time.

For more data circle 81 on Postpaid Card

Screw Thread Data

Standard Pressed Steel Co., Box 556, Jenkintown, Pa. Booklet entitled "The Root of the Thread" is the fifth in a series on screw thread fundamentals.

For more data circle 82 on Postpaid Card



in half the time

Brookfield Tool Holders make tool set-ups easy!

Now, without bushings or collets, on the first try you can set up drills, counterbores, reamers or cutters for almost any machining operation. Precision ground V-jaw vises, Brookfield Tool Holders make even toughest set-ups a cinch. With one wrench, insert the tool, tighten the jaw, then float the tool into dead center position and tighten. It's as easy as that!

FREE! Descriptive illustrated brochure, plus price and specification lists.

BROOKFIELD, INCORPORATED

STOUGHTON 111, MASSACHUSETTS

For more data circle 472 on Postpaid Card

Free Literature . . .

Hydraulic Presses

American Steel Foundries, Elmes Engineering Division, 1150 Tennessee Ave., Cincinnati 29, Ohio, Bulletin 1036-C on Elmes Hydrolairs, which are small, low cost air powered hydraulic presses. They were specially designed to meet the needs of small press users for laboratory test work, laminating, compacting and so on.

For more data circle 83 on Postpaid Card

Collet Vise

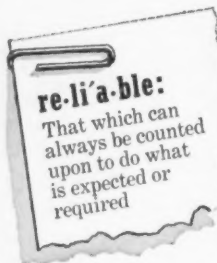
Dunham Tool Co., Inc., New Fairfield, Conn. Flyer on the Dunham "Chuxrite" No. 440 Rapid Action Collet Vise, which is a low cost holding device for secondary operations on cylindrical parts to $\frac{1}{4}$ inch in diameter.

For more data circle 84 on Postpaid Card

Gear Checking Machine

Cosa Corp., 405 Lexington Ave., New York 17, N.Y. Informative literature on the Mahr 890 Gear Checking Machine, which is a precision built, highly sensitive instrument that checks involute tooth flank profiles on spur helical gears, bevel gears and worm gears.

For more data circle 85 on Postpaid Card



CRATEX RUBBERIZED ABRASIVES

*Micro-deburring, Smoothing,
Cleaning, Polishing*

Cratex reliability lowers costs

You can count on every Cratex item to perform just as you expect it to—exactly as the last one did and as the next one will. This is the key to efficiency in micro-deburring, smoothing, cleaning and polishing. YOU SAVE TIME because you know just what to expect in performance without experimenting or compensating. YOU SAVE REJECTS because with Cratex no unexpected irregularities occur to spoil work pieces.

WHEELS • POINTS • BLOCKS • STICKS • CONES
in 4 grit textures for power or manual application. Sold through leading industrial supply distributors.

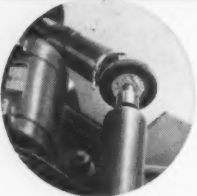
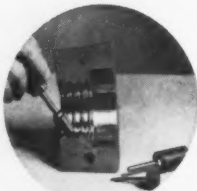
FREE! Send for the complete CRATEX Industrial Catalog today

CRATEX

MANUFACTURING COMPANY, INC.

1600 Rollins Road

Burlingame, California



Flat Sander

Albertson and Co., Inc., Sioux City, Iowa. Flyer provides information on the Sioux Air Driven Flat Sander with oscillating orbital action. Information is also given on Sioux Grind-A-Lite Resin Bond Abrasive Discs.

For more data circle 86 on Postpaid Card

Recess Toolholders

Bokum Tool Co., Inc., 14775 Wildemere Ave., Detroit 38, Mich. Four page color bulletin gives full information on Bokum Recess Toolholders with quick change adapters. These toolholders can be used on standard drill presses, radial drills, turret lathes and special machines.

For more data circle 87 on Postpaid Card

For more data circle 473 on Postpaid Card

Power Tools

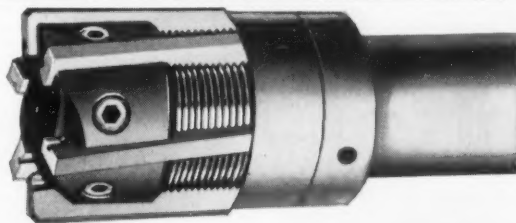
Boice-Crane Co., 937 West Central Ave., Toledo 6, Ohio. 44 page Catalog No. 60 includes the Golden Anniversary models of the company's line of power tools. Described and illustrated are band saws, contour saws, jig saws, saw tables, saw jointers, jointers, belt sanders, spindle sanders, shapers, shaper cutters, lathes, planers, drill presses, band filers, grinders and spinning tools. Among the new items included are the Challenger 10 Inch Tilt Arbor Saw.

For more data circle 88 on Postpaid Card

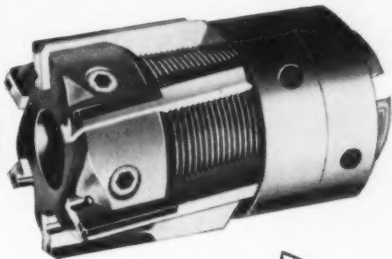
Vises, Plates, Tables

Chicago Tool and Engineering Co., 8399 South Chicago Ave., Chicago 17, Ill. A new pocket sized catalog shows more than 70 items, including Palmgren drill press vises, angle vises, milling machine vises, production vises, air vises, adjustable angle plates, cross slide milling tables, rotary tables, indexing tables and lathe milling attachments. Catalog No. P100 contains 18 pages that illustrate and fully describe the complete line of Palmgren products.

For more data circle 89 on Postpaid Card



McCROSKY *Super-Adjustable* **REAMERS**



Chuckling and Shell Designs

Sizes from 1 5/16" to 6" in Diameter

● McCrosky Reamers cut freely without chatter. They avoid any tendency to "dig in", and produce absolutely round, concentric holes with high finish. Exclusive pin and screw locking device permits the blades to be adjusted and reground quickly and accurately. You produce more pieces at lower cost!

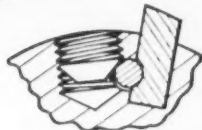


Diagram shows cross section of pin and screw locking device.

Send for Bulletin No. 20-R Today. It gives full details.▶

McCROSKY **TOOL CORPORATION**
MEADVILLE, PA.



Engineering and Sales Representatives in the Principal Cities
For more data circle 474 on Postpaid Card



Free Literature . . .

Elevating Feeders

Detroit Power Screwdriver Co., 2801 West Fort St., Detroit 16, Mich. Folder No. 2812 presents a complete line of elevating feeders for automatic feeding and orienting of parts. Details of construction and dimensional information on three standard size elevating feeders of 6, 12 and 20 cubic foot holding capacity are featured.

For more data circle 90 on Postpaid Card

Hack Sawing Machines

King Machine and Manufacturing Co., Berkroy Products Division, 1171 East 32nd St., Los Angeles 11, Calif. Flyer on Berkroy High Speed Hack Saws, Nos. 2 and 3.

For more data circle 91 on Postpaid Card

Transfer Machines, Drills

Barnes Drill Co., 860 Chestnut St., Rockford, Ill. A new eight page brochure outlines the company's complete line of equipment, including transfer machines,

production units, programming machines, standard drills, honing machines and coolant cleaning equipment. Illustrations include applications and parts, and data includes machine capacities. Request Bulletin GC-60.

For more data circle 92 on Postpaid Card

Quills

Bryant Chucking Grinder Co., Springfield, Vt. New 16 page catalog lists all quills that are available for Bryant Grinding Spindles. Detailed instructions for ordering the proper quill for each spindle are included. Also included is complete information on wheel binder screws and special wrenches.

For more data circle 93 on Postpaid Card

Proving Rings

Steel City Testing Machines, Inc., 8817 Lyndon Ave., Detroit 38, Mich. Bulletin F-260 is a four page, illustrated booklet that describes complete lines of dial indicator and optical proving rings;

FREE

new live center catalog



- Tells how to select Ideal Gold Band Live Centers to fill your needs *exactly*. Over 40 different sizes and styles in 4 models—**Universal, Multi-Duty, Heavy-Duty, Pipe Point**—custom quality performance at production prices.

WRITE TODAY

IDEAL INDUSTRIES, Inc.

1031-D Park Ave., Sycamore, Ill.

Send me the new Ideal Live Center Catalog.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

• Sold Through Leading Industrial Distributors •

For more data circle 475 on Postpaid Card



instruments of force measurements used to calibrate other devices and to measure applied loads accurately.

For more data circle 94 on Postpaid Card

Grinding Attachment

Landis Tool Co., Waynesboro, Pa. Bulletin M-60 contains four pages which illustrate and describe the Landis Mechanical Micro-Swivel for sensitive swivel table adjustments on new Landis Cylindrical Grinders. The Micro-Swivel is a low cost device for accurate swivel table corrections. It is simple to operate and will produce more accurate work in a shorter time.

For more data circle 95 on Postpaid Card

Stamp Holders

Acromark Co., 9 Morrell St., Elizabeth 4, N. J. Four page color bulletin and price list on Hercules Gang Stamp Holders. Quick release permits instant interchanging of letters and figures.

For more data circle 96 on Postpaid Card

Grinding Spindles

Dumore Co., 1302 Seventeenth St., Racine, Wis. Super precision grinding spindles bulletin contains all specifications, photos and other details on new spindles, which employ a new seal, known as Nilos Rings, completely sealing bearings from dirt, abrasives and coolants. Request Bulletin DM59.

For more data circle 97 on Postpaid Card

Ceramic Fiber

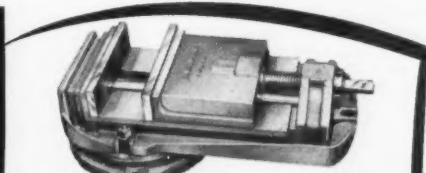
Carborundum Co., Buffalo Ave., Niagara Falls, N. Y. Fiberfrax

Ceramic Fiber, that withstands operating temperatures up to 2,300 degrees F., is presented in an eight page multi-colored brochure that gives the properties, available forms and current uses of this versatile high temperature material. Typical uses include linings for domestic oil burners, linings for induction furnaces, brazing metallic honeycomb sandwich panels in airframe industry, general furnace insulation and critical applications in missile and space vehicle programs.

For more data circle 98 on Postpaid Card



- Super-Strong Flange Construction
- All surfaces ground for extreme accuracy
- Full length bearing on ground bar and machine ways
- Steel jaws
- Work holding surfaces are always at true right to the table
- Large Acme steel screw with replaceable bronze nut.



MOGUL Jaws 1/2" thick, 8 1/2" wide and 2 1/2" deep open 6" when in place. Wt. 140 lbs. ONLY \$180.00	MASTER Jaws 1/2" thick, 6 1/2" wide and 2" deep open 4" when in place. Wt. 90 lbs. ONLY \$90.00	JUNIOR Jaws 3/8" thick, 4 1/2" wide and 1 3/4" deep open 2 3/4" when in place. Wt. 40 lbs. ONLY \$60.00
--	---	---

L-W ADJUSTO-QUICK CONTROL DRILL PRESS VISE AND FIXTURE HOLDER



The first wide range drill vise that safely handles both rigid and non-rigid work without distortion. Quick action and adjustable pressure at the turn of a knob. Easy hand pressure on hardened and micro-ground bar locks and holds the work.

Precision-built to cut tooling costs and increase production. Heavy removable jaw inserts allow simple, quick adaption for low-cost jigs and fixtures.

	Only
4" Model (3 1/4" Opening)	\$31.50
6" Model (6 1/4" Opening)	\$44.00
8" Model (8 1/4" Opening)	\$57.00

Available with or without swivel base.

SEE YOUR INDUSTRIAL SUPPLY DISTRIBUTOR OR ORDER DIRECT, GIVING DISTRIBUTOR'S NAME



LW



CHUCK COMPANY

28 So. St. Clair St.
Toledo 4, Ohio

For more data circle 476 on Postpaid Card



Free Literature . . .

Grinders and Buffers

Cincinnati Electrical Tool Co., 330 Mt. Hope Ave., Cincinnati 4, Ohio. Catalog on general purpose pedestal grinders, heavy duty bench grinders, combination grinder and buffer, two bearing heavy duty buffer, drill grinders, dust collectors, mist collectors and speed lathes.

For more data circle 99 on Postpaid Card

Air Gaging

Sheffield Corp., Dayton 1, Ohio. Publication No. SPG-160 is entitled "Sheffield Precisionaire Gaging." This 50 page handbook was written especially for inspection personnel, gage designers, tool engineers and quality control personnel. It describes in clear, non-technical language how to select the right amplification for the gaging job, when to use long range air gages, the advantages and principles of air gaging inside diameters, outside diameters and

other geometrical conditions and many other facets of dimensional control. The handbook also lists the large variety of standard adjustable and special tooling and gaging fixtures that are used with column type instruments.

For more data circle 100 on Postpaid Card

Wiper-Scraper Seal

Chicago Rawhide Manufacturing Co., Oil Seal Division, 1301 Elston Ave., Chicago 22, Ill. Bulletin SC-100 presents the SC Wiper-Scraper Seal. Scraper and wiper in one single unit provides effective, low cost protection for packings on reciprocating shafts and hydraulic cylinder rods.

For more data circle 101 on Postpaid Card

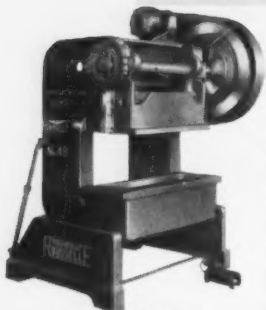
Vibration Fatigue Testers

All American Tool and Manufacturing Co., 8027 Lawndale Ave., Skokie, Ill. Flyer on the Model 150 VP-D Vibration Fatigue Testing Machine, with a load capacity of 150 pounds at 10 g. The unit has a 50 percent overload safety factor.

For more data circle 102 on Postpaid Card

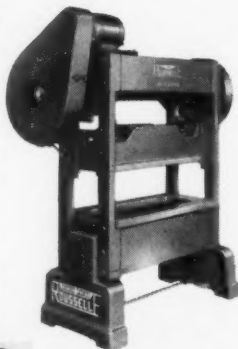
High-Output with ROUSSELLE

DOUBLE-CRANK PRESSES

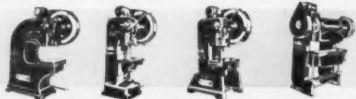


No. 48 OBI with "Econo-Air" clutch.

SPEED UP PRODUCTION with these versatile 40-ton presses. Large bed and ram areas make them ideally suited to handle wide rolls or sheets . . . do multiple punching, steel-rule die work and other high output operations. For rapid, shockless starting and stopping, presses can be equipped with electrically controlled "Econo-Air" friction clutch . . . Ask for new catalog.



Choice of over 30 models and types in 5 to 60-ton sizes



STRAIGHT SIDE - Die space up to 24 in.; bed space up to 6 ft. between uprights.

SERVICE MACHINE COMPANY

Mfrs. of Rousselle Presses

2310 WEST 78TH STREET • CHICAGO 20, ILLINOIS

Rousselle Presses are sold exclusively through Leading Machinery Dealers.

For more data circle 477 on Postpaid Card

Hydraulic Fittings

L and L Manufacturing Co., 21590 Hoover Road, Warren, Mich. 16 page catalog describes a new and complete line of flange type hydraulic tube and pipe connection fittings. Thirty specific models, varying in type of line attachment, angle of flow, male or female form and including several tee combinations, are fully diagrammed and dimensioned in this brochure.

For more data circle 103 on Postpaid Card

Salt Bath Furnaces

Lindberg Engineering Co., Salt Bath Furnace Division, 2443 West Hubbard St., Chicago 12, Ill. Bulletin No. 151 describes and illustrates the unique advantages of the graphite "continuing" electrodes in salt bath furnaces. Data is also given on high and low temperature salt bath furnaces for any production, pilot plant or laboratory use.

For more data circle 104 on Postpaid Card

High Strength Steel

Universal Cyclops Steel Corp., Bridgeville, Pa. 20 page color brochure on Unimach UCX2 Ultra High Strength Steel for propellant chambers and other structural applications in missiles. Sections of this brochure are devoted to chemistry, physical properties, general heat treatment, fabrication and machinability, weldability and mechanical properties.


For more data circle 105 on Postpaid Card

Bench Center and Surface Plate

K. O. Lee Co., Aberdeen, S. Dak. Flyer on the K. O. Lee Bench Center and Surface Plate, Model BC3. It provides an accurate means for inspecting all types of work. Workpieces can be mounted between centers, in vee rests or on precision ground surface plate.

For more data circle 106 on Postpaid Card

READ TEMPERATURES FAST



ACCURATELY with PYRO OPTICAL PYROMETERS

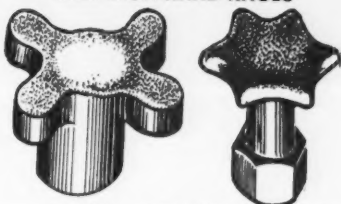
Send for catalog No. 85
PYROMETER INSTRUMENT CO., INC.
Bergenfield 42, New Jersey

For more data circle 478 on Postpaid Card

April, 1960

REID TOOL ROOM ACCESSORIES

CAST IRON HAND KNOBS



PRONG LONG SHANK with wrench hex

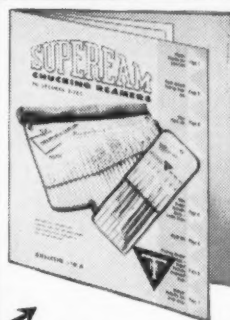
Supplied in types illustrated. Also in scalloped type. Fine grain cast iron. No sharp edges. Wide variety of sizes. Regularly furnished in blank but when specified can supply drilled and tapped or drilled and reamed.

FREE 76 PAGE CATALOG

Listing 1600 needed tool room accessories and components such as plastic and steel ball handles, malleable machine handles, compression and extension spring assortments, etc.

REID TOOL SUPPLY CO. MUSKEGON HEIGHTS, MICHIGAN

For more data circle 479 on Postpaid Card



DECIMAL REAMERS and Counterbores

Selections by the THOUSANDS
STYLES • DIMENSIONS
RANGES • SELECTABILITY
STOCK ITEMS • NET PRICES
WHY BUY SPECIALS?

Send for this catalog NOW!



TWENTIETH CENTURY MFG. CO.
Box 429-M
LIBERTYVILLE, ILLINOIS

For more data circle 480 on Postpaid Card

MODERN MACHINE SHOP 221

NEED A SPECIAL TAP?



fast!

SOSSNER HAS 120,000 BLANKS ON HAND just for Special Taps

This means we can make *normal unexpedited delivery* of simple special taps *within two weeks' time.*

**CUSTOMIZING WITHOUT DELAY
TO GIVE YOU THE SPECIAL
TAP ENGINEERED FOR YOUR
SPECIAL JOB.**

**Special Hooks and Rakes
Reliefs
Surface Treatments**



If there are additional features which make for some complication, but still permit use of standard blanks, we deliver in three weeks. Special taps that have to be made from bar stock take longer but not nearly as long as you may be used to waiting.

SOSSNER

TAP & TOOL CORPORATION

29 BROADWAY LYNEROOK, L.I. N.Y.

FACTORY WAREHOUSES IN NEW YORK • LOS ANGELES • ST. LOUIS • DALLAS

For more data circle 481 on Postpaid Card

NEW RANGE OF SIZES

DiaTest

HIGH PRECISION

SMALL BORE GAGE

- **RANGE:** .047" to 1.130"
- **5 SETS**, fully equipped with rings and measuring heads.
- **READINGS IN .0001"**
- **ACCURACY TO .00008"**

DiaTest checks out-of-round, tapers, incomplete bores and all other variations. All sets overlap in size for complete range.

All parts available separately.

EACH SET complete with dial indicator.

SET No.	RANGE
E-1	.057" — .170"
E-2	.165" — .390"
E-3	.372" — .828"
E-4	.820" — 1.130"

*E-1FB	.057" — .170"
*E-2FB	.165" — .390"
*E-3FB	.372" — .828"
*E-4FB	.820" — 1.130"

*For measuring to the bottom of closed holes. (Require special contact needles.)

ANNOUNCING NEW SETS

- **SET No. E-0:** Range .047" to .062"
- **SET No. E-161:** Nominal Range, $\frac{1}{16}$ " to $\frac{3}{8}$ "
(A "fractional" set, in increments of $\frac{1}{16}$ ")

RIGHT-ANGLE ATTACHMENT, EXTENSION RODS, AND DEPTH ADJUSTER ACCESSORIES ARE INTERCHANGEABLE.

Write today,
or call
Newcastle 1-8888
for full
information.

FOSTER SUPPLIES CO.

6122 Milwaukee Ave., Dept. MMS, Chicago 46, Illinois

For more data circle 482 on Postpaid Card

On Display at the



Descriptions of products to be shown at the American Society of Tool and Manufacturing Engineers' Show, April 21-28.

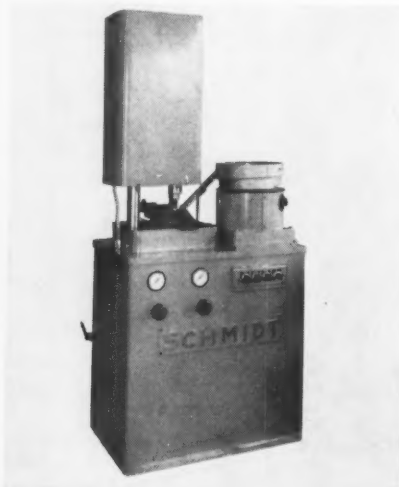
MARKING MACHINES

In Booth 147, Geo. T. Schmidt, Inc., 1806 West Belle Plaine Ave., Chicago 13, Ill., will show in operation its Pneumark Impact Bench Press, Model 10T. It will be marking hex nuts which are hopper fed.

This machine was specifically designed for efficient production marking of identification into steel parts or nameplates. Features include: low

initial cost, compact bench size, fast setup without down time for further adjustment, safe fully automatic operation and production rates of from 3,000 to 3,600 pieces per hour. It stamps character sizes from 1/16 to 1/4 inch. Uniform marking is obtained on parts which have slight thickness variations without changing pressure setting. The unit features a full 10 ton maximum stamping capacity and air line range of from 20 to 100 pounds. It can be equipped with dial feed with automatic cycling and intermittent movement, as well as stacker feed. The steel base is drilled and tapped for setting up a variety of fixtures or nests. Die space is quickly raised or lowered on the column by a single rack and pinion adjustment.

For more data circle 107 on Postpaid Card



Model 10T Pneumark Impact Bench Press.

★ modern machine shop ★

TIMESAVING TOOLS

Four timesaving tools of special interest to the metalworking industry will be exhibited by Cogsdill Tool Products, Inc., 12976 West Eight Mile Rd., Oak Park 32, Mich., in Booth 306.

(1) A new tube end finishing tool, called the TuBurr, performs three operations in one cycle: chamfer o.d., i.d. and endface. Cutting blade is con-



Edited by L. L. BALDHOFF

tained in a spring loaded, carbide cone tip. Upon contacting the work, the cone retracts, exposing the blade for cutting. (2) BurrAway tool removes burrs from front and back surfaces around holes. It features a spring loaded, double edged cutting blade which chamfers the front surface during forward stroke, depresses to pass through the hole, then emerges to chamfer the back surface upon return stroke. (3) BakSink tool counterbores, countersinks and will do radii cutting of reverse surfaces. It features a cam controlled cutter blade with depth adjustable in 0.001 inch increments. (4) Bearingizer is for surface finishing and sizing of holes, shafts, flat surfaces, contours and so on. It obtains surface finishes generally less than 10 micro inches with tolerances of 0.0002 inch. High speed, cam actuated rollers deliver rapid fire blows to "peen" the work surface.

For more data circle 108 on Postpaid Card

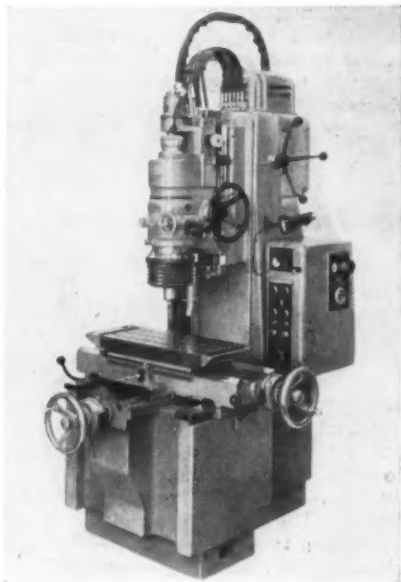
★ modern machine shop ★

JIG BORERS AND GRINDERS, MEASURING MACHINES AND ROTARY TABLES

In Booth 1105, Moore Special Tool Co., Inc., 730 Union Ave., Bridgeport 7, Conn., will show the Model No. 3 Jig Borer, the Model No. 3 Jig Grinder, its Universal Measuring Machine

and the Model No. 2 Rotary Table.

The company claims that extraordinary precision, that performs work far beyond the former limitations of ten-thousandths inch and a complete incorporation of calibrations in the new standardized International Inch, are features of the jig borers, jig



Moore Model No. 3 Precision Jig Grinder.

ASTME Tool Show . . .

grinders, universal measuring machines and rotary tables.

The Model No. 3 Jig Borer permits the location, boring, drilling and reaming of holes in dies, jigs and production parts with an accuracy beyond one ten-thousandth inch. The Model No. 3 Jig Grinder makes possible finer tolerances, plus a greater range and larger table, than its predecessor models to meet the more demanding technological requirements of the missile era. Designed to provide ultra fine precision measurement and exacting inspection standards, the Model No. 3 Universal Measuring Machine can measure to one-third of a "tenth", which makes it ideally suited for measuring large workpieces to laboratory tolerances. The Model No. 2 Ultra Precise Rotary Table was developed to meet industry demands for more precise angular spacing and it can read direct to 1 second with overall performance accuracy of plus or minus 2 seconds throughout the entire 360 degrees.

For more data circle 109 on Postpaid Card

★ modern machine shop ★

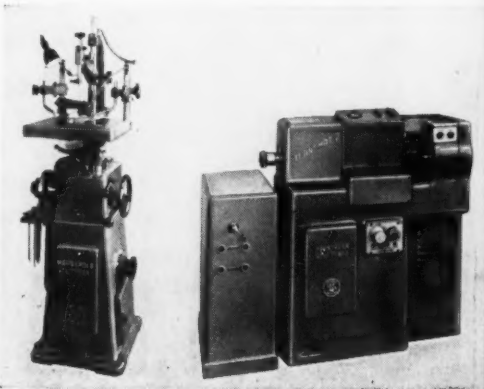
HIGH PRECISION EQUIPMENT

In Booth 314, International Machine and Tool Corp., P. O. Box 3595, Cranston 10, R. I., will exhibit various types of high precision equipment; such as the Maho Universal Tool Milling and Coordinate Boring Machines, which are particularly efficient on tools, fixtures, coordinate boring, punches, gages and molds and can also be used to advantage in batch production and on prototype work. The Optigon B II Optical Dividing Head with optical projection system can be used for the checking of true circular divisions or angles, as well as in production, measurement and testing of gears, keyways,

controller cylinders, camshafts and so on. The Tornomat 2 Polygon Turning Machine features a fully or semi-automatic work cycle control that aids in securing mass or batch production of hexagonal collar screws (cold upset of high grade tensile strength, squares on tool shanks, as well as of two parallel faces on machine parts to be performed with utmost efficiency). The Jung Hydraulic Precision Surface Grinders, Type F, feature a grinding spindle head which is pillar mounted into the enlarged and rigid machine base. The increased rigidity resulting from this change insures grinding of greater precision in a shorter time and over larger surfaces. The Jung High Precision Rotary Surface Grinder, Model H-30, features infinitely variable spindle speed control between 1,000 to 4,000 revolutions per minute.

Other products on display include heavy duty filing and sawing machines for economical production of punching and stamping tools, openings and so on; Maho Universal Tool Milling and Die Sinking Machines; Bilz Convex Turning Attachments and Concave Turning Attachments; and rotary tables and index bases.

For more data circle 110 on Postpaid Card



(Left) Heavy Duty Filing and Sawing Machine and (Right) Polygonal Turning Machine.

TAP SHARPENING EQUIPMENT

In Booth 818, Henry P. Boggis Co., 708 East 163rd St., Cleveland 10, Ohio, will exhibit its complete line of grinders and fixtures for sharpening and reconditioning taps.

The improved Model 1100 Grinder will sharpen chamfers, flutes and spiral points. It has capacities from No. 6 machine screw to 2½ inch hand taps. The Model 1400 Grinder, which sharpens chamfers only, has a dust sealed trunnion action for feeding the 6 inch diameter grinding wheels. The new Size K and L Chamfer and Flute Sharpening Heads have increased capacities and feature quick change cam pin plates, making it possible to sharpen taps with any number of flutes. The new Hybco Model 2100 Two Way Relieving Fixture will be

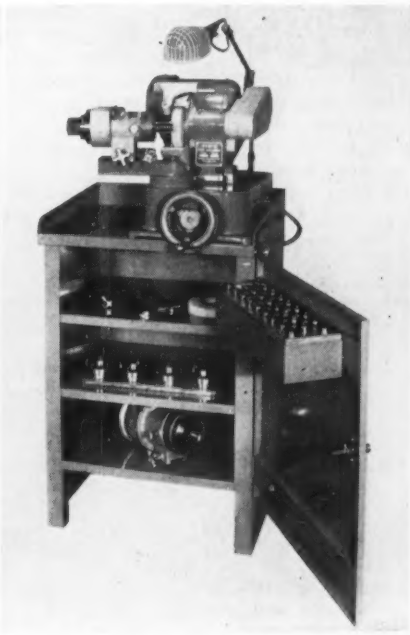
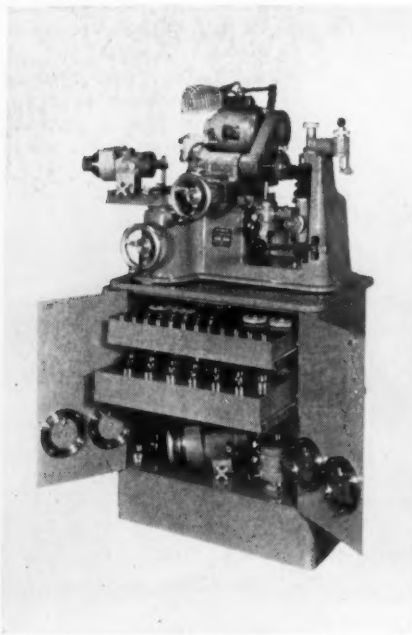
shown for the first time. Both radial and axial relief can be obtained in conjunction one with the other or independent of each other. Unique adjustments provide a variable amount of relief, which can be measured by a dial indicator for fast accuracy. Maximum collet capacity of the head is 1 1/16 inch and a 4 inch six jaw adjustable chuck is available.

For more data circle 111 on Postpaid Card

★ modern machine shop ★

MULTI-PURPOSE PRECISION METALWORKING MACHINE

A new multi-functional metalworking tool designed for machine shops, toolrooms, labs or wherever space is at a premium, is featured in Booth 2054 by American Edelstaal, Inc., 350 Broadway, New York, New York.



(Left) Hybco Model 1100 Tap Grinder and (Right) Hybco Model 1400 Tap Grinder.

It is said that "The Maximat" will convert from a 10 inch bench lathe to a vertical milling machine or drill press in a matter of minutes. It has been designed not only as a space saver, but as one fine precision machine to do the job of three or four.

The Maximat bed is a massive, one piece, seasoned, semi-steel casting with hand-scraped ways on all bearing surfaces. A unique feature is the vertical column. Together with the detachable headstock and motor unit, the Verti-Bed is the base for all vertical operations, and enables Maximat to be used not only as a precision lathe, but also as a precision vertical milling machine, drill press or jig borer. In addition, many other units may be mounted on the vertical bed for secondary operation work. Attached to the back of the bed, the Verti-Bed is designed so that, when mounted, it does not interfere with lathe operation. The powerful, precision built, multifunctional, detachable headstock, together with the motor unit, can be removed for Verti-Bed mounting.

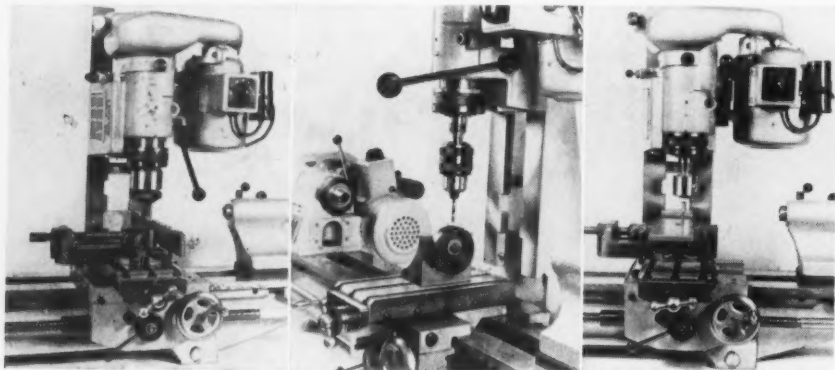
For more data circle 112 on Postpaid Card

RIVETING AND THREADING MACHINES

In Booth 1747, Grant Mfg. & Machine Co., 96 Silliman Ave., Bridgeport 5, Conn., will show three machines.

The Model 2TM Double End Automatic Threading Machine is a fast, accurate and rugged unit, designed to operate simultaneously on both ends of such parts as tubes, rods and spindles. Work is placed in the magazine by the operator and drops by gravity into feed fingers. Transfer slides then convey each successive piece to a position between the clamping jaws, which firmly grip the work. The tool heads, advanced by large drum type cams at the front of the machine, perform their operation, withdraw and the work is ejected. The entire machine cycle is completely automatic. At the Show, this machine will be equipped with a pair of No. 5TRR Landis Thread Rolling Die Heads and will be set up to work on $\frac{3}{8}$ inch diameter tubing.

The Model 220AT Rivet Spinning Machine is a noiseless, blowless riveter that will produce a highly polished head by rotary movement and pressure in $\frac{1}{2}$ to $1\frac{1}{2}$ seconds. The head, which is formed, may be flat, concave, conic



"The Maximat" is shown at the left set up as a vertical milling machine; (Center) unit is shown set up as a vertical drill press; and (Right) set up for jig boring.

or a special shape and does not show tool marks. Either a tight or a flexible joint may be obtained with repetitive accuracy. As illustrated, the machine will be equipped with an automatic mechanical trip, which insures correct spindle motion for proper riveting performance without reliance on the skill or strength of the operator. The machine will also be equipped with a Gray GEM-17 Index Table.

The Model 3AB Rotary Vibrating Riveter is ruggedly built and is especially suitable where the finished joint must be extremely strong or where the riveting operation must be performed in a very confined location. However, the machines may also be used to form heads on the smallest, most delicate work and they are equipped with three step cone pulleys from the motor drive and may be obtained with a shorter hammer travel, where necessary. As illustrated, the machine will be equipped with a timer and solenoid for dependable uniformity from rivet to rivet without dependence on the skill of the operator.

For more data circle 113 on Postpaid Card

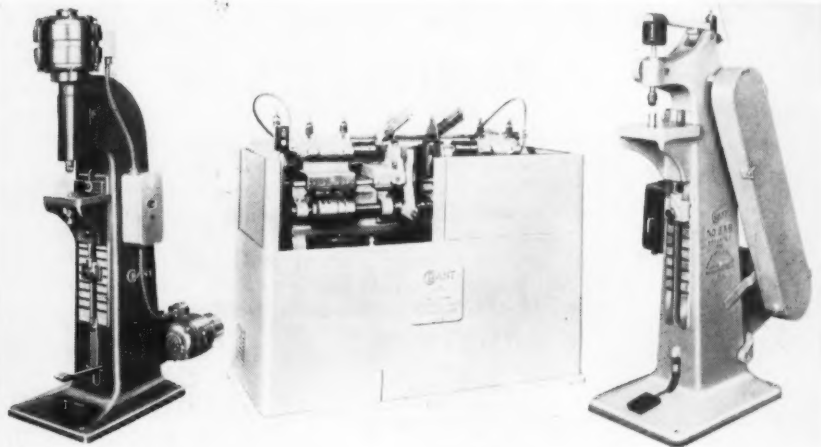
INTERNAL HONING MACHINES

Sunnen Products Co., 7924 Manchester Ave., St. Louis 17, Mo., will feature latest models of internal honing machines in actual operation in Booth 1155.

Among the products on display will be a new line of small bore honing tools for holes as small as 0.100 inch in diameter.

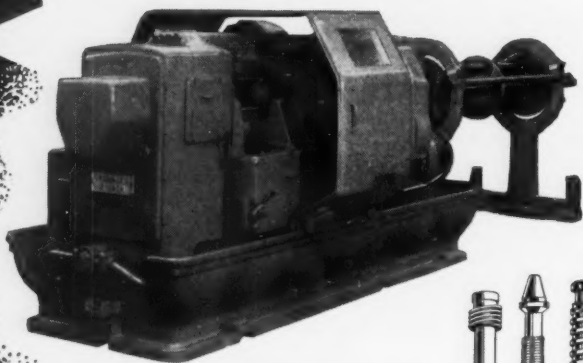
A new series of honing tools for bores with keyways or splines will also be introduced at the Show. Each of these tools has double the diameter range of previous tools and requires only a fraction of former truing-in time. These tools will be available from stock in the $1\frac{3}{8}$ to $2\frac{3}{4}$ inch range and on special order up to $3\frac{3}{4}$ inches in diameter.

A new development in portable honing tools is a heavy duty cylinder hone with a feed-up mechanism, which allows honing stones to be advanced while the honing tool is revolving deep inside the work, thus greatly increasing production rates. These hones are recommended for honing bores from



(Left) Rivet Spinner, (Center) Threader and (Right) Rotary Vibrating Riveter.

Lead-Screw Threading and Tapping on GREENLEE AUTOMATICS



SAVES YOU

✓ **MONEY**

✓ **MAINTENANCE**



Lead-screw threading and tapping attachments for Greenlee Automatics make it easy to thread parts otherwise impractical for automatic bar machine operations. Smooth, precision threading with excellent finish make this type of operation profitable for you.

Look over the threaded products at the right . . . then ask your Greenlee Representative to show you this and other ways Greenlee Automatics can help you beat rising production costs.

WRITE
FOR
CATALOG
A-405



GREENLEE BROS. & CO.
1750 MASON AVENUE
ROCKFORD, ILLINOIS

For more data circle 483 on Postpaid Card



(Upper Left) The Sunnen NIOX Continuous Planetary Feed Heavy Duty Cylinder Hone, (Lower Left) Sunnen Adjustable Shoe Mandrel and (Right) Sunnen PG-250 Extension Point Set.

2 $\frac{3}{4}$ through 20 $\frac{1}{2}$ inches i.d. up to several feet in length.

The latest improved models of the Sunnen Hole Gaging and Measuring Equipment will also be shown and demonstrated, together with new accessories which extend the $\frac{3}{8}$ to 1 $\frac{1}{2}$ inch diameter standard range up to 3 inches. This precision gaging equipment requires no setting blocks or ring gages, reads size accurately in "split tenths" (down to 0.000025 inch, if needed) and is available to every user on a simple, no up-keep rental plan. For more data circle 114 on Postpaid Card

★ modern machine shop ★

HEAVY DUTY TAPPING ON ANY DRILL PRESS

Visitors to the Show will have an opportunity to see a new tapping attachment, developed by Supreme Products Corp., 2222 South Calumet

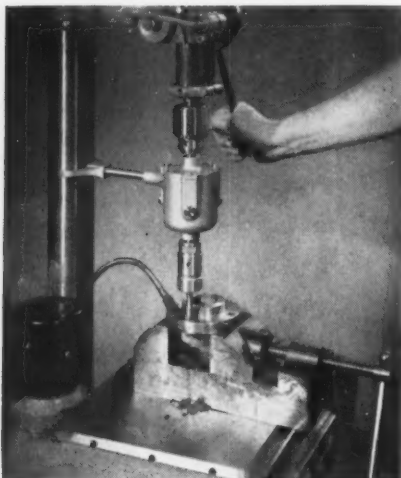
Ave., Chicago 16, Ill., in Booth 917.

The "Versatapper" is an attachment that can be used on any drill press. With it tapping is feasible in any material and at any diameter from No. 10 through $\frac{1}{2}$ inch. The unit works equally well on tool steel, mild steels and non-ferrous materials.

The manufacturer states that the principle advantage of this new unit is its unusual versatility, particularly for small shops. It can be installed on a drill press in less than a minute. After the tapping is completed, the attachment can be removed just as quickly. This permits the mechanic to use a drill press for all its regular work and switch it over to tapping when necessary.

The principle of operation of the Versatapper is quite simple. The unit contains a 4:1 planetary gear reduction system. From this, power is transmitted to the forward and reversing

ASTME Tool Show . . .



The Versatapper Tapping Attachment.

clutch members by a bevel gear train. When the thrust is down, into the work, the forward clutch engages. When the drill press lever is raised, the reversing gear is engaged and the tap backs out easily. The company states that the tool will operate well within the tolerance requirements for all ordinary shop work.

There are three major parts to the Versatapper. There is the reduction and reversing gear train unit. Attached to this is an arm or yoke which extends horizontally to the main column of the drill press. This arm supports and steadies the tool during the tapping operation. The third part is the chuck that holds the tap.

For more data circle 115 on Postpaid Card

★ modern machine shop ★

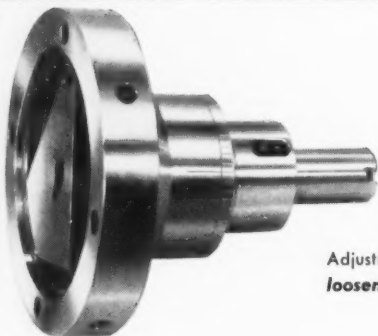
HEAT TREATMENT

In Booth 2027, Sentry Co., Foxboro, Mass., will feature quality heat treat-

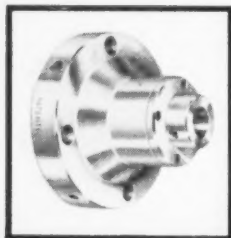
BRINEY

PRECISION BORING QUILLS

**PERMIT
AUTOMATIC
RETRACTION
AND FEED-OUT**



Adjustments to 0.0001 **without
loosening or tightening screws.**



OTHER SPECIALS—miniaturized quills for cluster boring, combination bottom facing and I.D. boring with precision depth and bore control, block type tooling for precision boring and O.D. turning on vertical or horizontal bed multi-purpose machines, and many other applications.

AND STANDARDS—carried in semi-finished stock for quick delivery.

SPECIFY BRINEY PRECISION QUILLS ON ORIGINAL EQUIPMENT
WRITE TODAY FOR COMPLETE DESCRIPTIVE LITERATURE

BRINEY MFG. CO. 1165 SEBA RD. • PONTIAC, MICH.

For more data circle 484 on Postpaid Card

PUSH BUTTON *Speed Selection* from to in seconds

or to *any* intermediate speed, *instantly* 

Just push a button and watch the large tachometer dial on the headstock!

It's that easy!

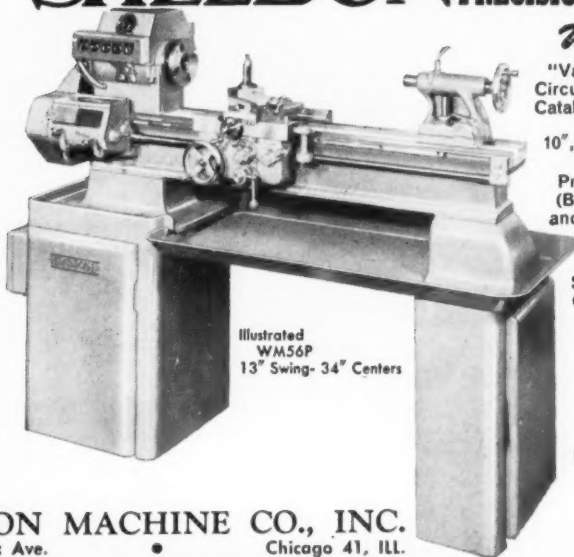
The work is done by a motor driven speed changer. It accelerates or slows the lathe to any desired speed in seconds. With a 10:1 ratio, this new variable drive makes it easy to select from a wide range of speeds—200 to 2000 rpm in direct drive and 40 to 300 rpm in back gear.

Maximum stability and smooth

power transmission are assured because the drive unit is oversized. All pulleys and shafts are fully supported (eight bearings). Double V-belts throughout the drive eliminate slippage and deliver full power to the spindle. Because of this rigidity and extra pulling power, this lathe will take heavy cuts at all speeds and precision finish cuts at high speeds.

It is a precision lathe, moderate in price, with the versatility for toolroom, production or second operation jobs.

SHELDON *Variable Speed* **PRECISION LATHES**



Illustrated
WM56P
13" Swing- 34" Centers

Write for

"Variable Speed"
Circular and General
Catalog showing . . .

10", 11", 13" and 15"

SHELDON
Precision Lathes
(Bench, Pedestal
and Cabinet types)

13" and 15"
SEBASTIAN
Geared Head
Lathes

SHELDON
Milling
Machines

SHELDON
Back Geared
Shapers

See us at
ASTE Show,
Detroit,
April 21-28,
Booth 1727

SHELDON MACHINE CO., INC.
4250 N. Knox Ave. Chicago 41, ILL.

For more data circle 485 on Postpaid Card

ASTME Tool Show . . .

ment of high carbon, high chrome and high speed steels.

The Sentry Company will have in operation a Model "Y" Electric Furnace of latest design, demonstrating scale free, decarburization, free hardening on moly high speed steel.

Positive, protective atmosphere for



The Sentry Model "Y" Electric Furnace.

Spra - Kool

**MIDGET
MIST-COOLANT
GENERATOR**

\$995

Complete
**GUARANTEED
PERFORMANCE**

Order Sample or Write for Bulletin

BAR PRODUCTS CO.

4803 WHITE OAKS AVE. ROCKFORD, ILL.



For more data circle 486 on Postpaid Card

Spin Your Rivets Faster

**on the
NOISELESS
LINLEY
RIVETER**



Cut production costs with the Linley. Quickly produces finely finished rivets. Takes rivets up to 3/8" in diameter in iron and cold rolled steel; even larger sizes in brass, aluminum and other soft metals. Send sample parts to be riveted and without obligation we will give you cost and time estimates of doing the job the easy Linley way.

Send Today For Bulletin R

LINLEY BROTHERS CO.

Also Builders of Jlg Bore

671 State St. Ext., Bridgeport 1, Conn.

For more data circle 487 on Postpaid Card

234 MODERN MACHINE SHOP

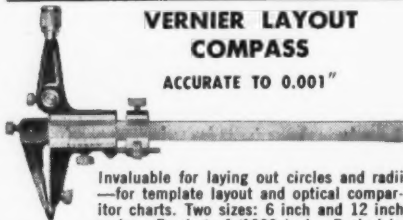
high carbon, high chrome and high speed steels is created within the furnace work chamber by means of Sentry Diamond Blocks. This simple, effective atmosphere requires no adjustment or special operator skills. Tools can be "soaked" in the Sentry Block atmosphere in order to assure full hardness without any danger of surface deterioration.

Tool Show visitors are invited to bring samples of their high speed steel tools for "on the spot" demonstration hardening.

For more data circle 116 on Postpaid Card

VERNIER LAYOUT COMPASS

ACCURATE TO 0.001"



Invaluable for laying out circles and radii —for template layout and optical comparator charts. Two sizes: 6 inch and 12 inch scales. Reads to 1/1000 inch. Packed in wood case including Phono-needle points and scriber. Write for literature.

Dealer Inquiries Invited

TITAN TOOL SUPPLY CO.

1419 Hertel Ave. • Box B • Buffalo 16, New York

For more data circle 488 on Postpaid Card

April, 1960

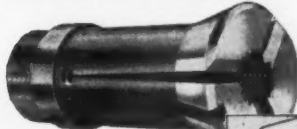
**ALL SHEFFER STANDARD COLLETS
HAVE SHEFFER CLOVER-LEAF GRIND**



Depressed grind at slit assures better collet action. Standard on all sizes and designs for all automatics, lathes, mills, etc. Special collets to your prints.



**NOW AT STANDARD PRICES
SHEFFER SELF-CLEANING COLLET***

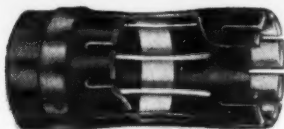


Inclined planes throw coolant, sludge, chips away from slits. Proved highly efficient in preventing travel of sludge back to mechanism. Reduces down-time.



SHEFFER PRODUCTS ARE BEST

**SHEFFER "ECONOMY" PUSHER*
GIVES MORE PIECES PER BAR**

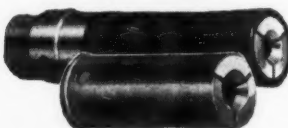


Dual bearings for positive grip with less pressure. Gives more pieces per bar. Available in solid bronze for soft finished surfaces. Also conventional and "squirrel cage" pushers.

**WRITE FOR YOUR COPY
OF OUR NEW COLLET
PRICE LIST AND CATALOG.**

**UP-TO-THE-MINUTE INFORMATION.
EASY TO READ.**

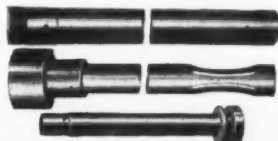
**SHEFFER "BB" PUSHER HAS*
SIMPLE ONE-PIECE INSERT**



Single insert holds stock in most cases to full rated capacity. Reduces stress and wear. Easy to stock and assemble. Made in several materials. Also available with 3-piece pads.

*Patent applied for

**SHEFFER HAS COMPLETE LINE
OF SCREW MACHINE ACCESSORIES**



Collet tubes and pushers, tubes with spools, etc., collet tube adjusting nuts, pusher tube bushings for all automatic screw machines.

Write for our catalog

**MEET THE DEMAND FOR PRECISION
WITH TOOLS THAT MAKE PRECISION EASY**

SHEFFER COLLET CO.

TRAVERSE CITY, MICH.

For more data circle 489 on Postpaid Card

ASTME Tool Show . . .

MARKING EQUIPMENT

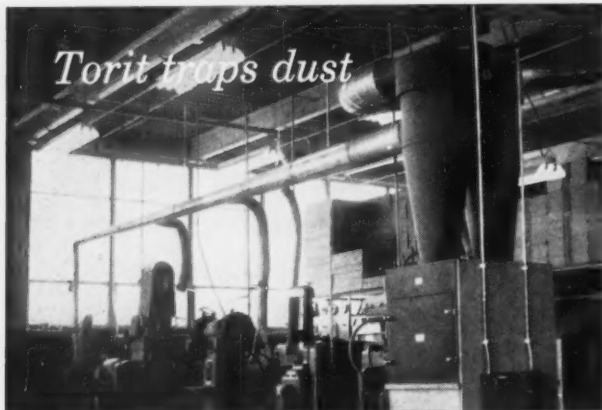
Noble and Westbrook Mfg. Co., 25 Westbrook St., East Hartford 8, Conn., will exhibit a large line of its newest production marking equipment in the Noblewest Mark-O-Rama, Booth 1446.

Featured will be the versatile Model 50P1 Roll Marking Machine. This pneumatically operated, general purpose roll marking machine marks

round or flat workpieces at speeds up to 1,500 pieces per hour.

For the first time, the company will exhibit its circular graduating machine. Other features will be the Series 19, Model 501 Rapid Production Vertical Dial Marking Machine, tooled for marking manufacturer's identification and sizes on high speed steel twist drills. The machine is equipped with a gravity feed chute, which can be manually loaded or hopper fed, making the entire operation semi-

automatic. Noblewest will also exhibit its Series No. 9 Bench Model 9 all pneumatic roll marking machine and the Model 450 Air Marking Press with capacity up to 7½ tons. Rounding out the exhibit will be representative models of the company's automatic numbering heads, miscellaneous marking tools and many fine examples of precision engraved



*Six machines protected from dust
by Torit for* **\$666 ¹⁵**

This Torit Dust Collector, Model 219FM, complete with accessories, was installed by the Mohr Lino Saw Co., Skokie, Ill., to protect 3 belt sanders and 3 other grinders (2 grinders hidden from view) from destructive dust—at a total cost of just \$666.15!

After one year's operation, Mohr Lino Saw says this about their *low-cost* Torit installation: "The Torit installation has kept our shop *cleaner*, our operators *happy*, and *protected vital machinery*."

You too can achieve greater machine protection and cleaner working conditions by trapping dangerous or valuable dust *at its source* with a completely *self contained* and *portable* Torit Dust Collector. For full details write to:

TORIT MANUFACTURING CO.

Dept. 703, 1133 Rankin Street, St. Paul 16, Minn.

For more data circle 490 on Postpaid Card



Roll Marking Machine

For the Precision
of a Count-down



T-J

LAUNCHES A NEW
CUTTING TOOL LINE
FOR MILLING ACCURACY

For precision milling to close tolerances, so vital in today's high-speed, high-production manufacturing, T-J now offers a new, improved line of milling cutters. The new cutter line features a high helix angle, double back-off, and a right-hand spiral to produce more and smoother cuts between grinds, and a free-cutting, stronger tool.

Specially designed and precision-manufactured for die sinking and production milling, the new line is designed to include flats on the shanks for set screw type drivers on all of the end and side milling cutters. Write today for complete information to the Tomkins-Johnson Company, Jackson, Mich.

Ask for completely new
cutter catalogue No. 259.

T-J

TOMKINS-JOHNSON

RIVETORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHERS

For more data circle 491 on Postpaid Card

ASTME Tool Show . . .

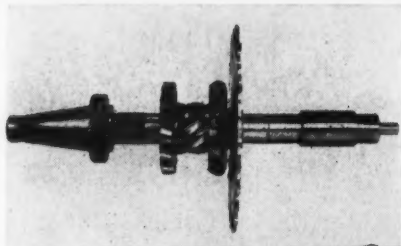
marking dies. A staff of engineers and sales personnel will demonstrate and explain the operation of all of the equipment displayed.

For more data circle 117 on Postpaid Card

★ modern machine shop ★

MULTIPLE OPERATION TOOLING

O. K. Tool Co., Inc., 800 Elm St., Milford, N. H., will emphasize multiple operation tooling, particularly in milling cutters, both inserted blade and solid high speed steel types, in Booth 567. These tools combine all possible operations in one pass and allow drastic reductions in setup time, while taking full advantage of the power available in today's modern machines. In addition, a Wickman Car-



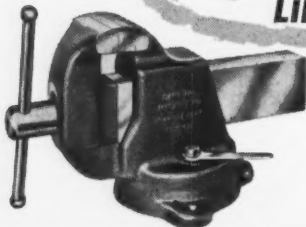
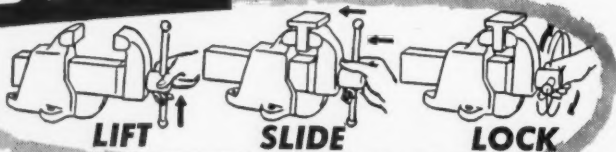
Multiple Operation Tooling in Booth 567.

bide Impregnator will be demonstrated to show simplicity of operation and wide range of application. This portable unit, complete with carbide electrodes, plugs into any 110 volt outlet. Two settings, coarse and fine, allow the operator to impregnate large surfaces to a depth of 0.003 inch or small areas to a depth of 0.0005 inch.

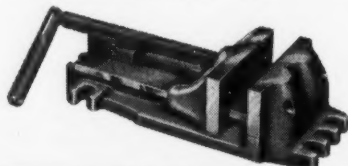
Bring along a drill or similar simple tool and try this machine for yourself. For more data circle 118 on Postpaid Card

SPEED VISE

the Vise with INSTANT ACTION



MACHINIST'S VISE—Positive locking, fast action—with stationary or swivel base. Choice of three jaw widths: 3½", 4" or 4½". A rugged money-saver, built to last.



PATENTED UNDERCUT THREAD design grips positively when the vise is clamped. Proved in use for 20 years, on the high-production Drill Press SPEEDVISE.

Write for New Catalog

CARDINAL MACHINE COMPANY

1819 DANA STREET

GLENDAL, CALIFORNIA

For more data circle 492 on Postpaid Card

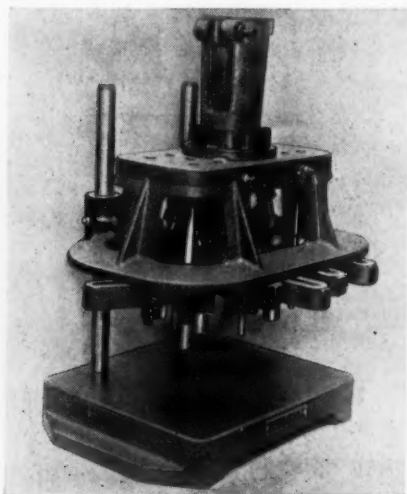
DRILLING AND TAPPING HEADS AND ATTACHMENTS

In Booth 1760, Ettco Tool and Machine Co., Inc., 598 Johnson Ave., Brooklyn 37, N. Y., will exhibit the Model 1100 "Knuckle-Head," which can be operated with from two to 11 spindles. It converts any single spindle drill press into a high production, multi-hole operation. It is extremely flexible and offers a large work area.

Ettco's Model 400 Knuckle-Head, a fully adjustable four spindle drilling and tapping head, meets the demand for a compact, lightweight unit to perform small, delicate production operations. Small and easy to handle, this head eliminates the need for using larger, more expensive and cumbersome adjustable heads for most smaller jobs.

A new tapping attachment, called the Auto-Tap Lead Screw Tapping Attachment, enables any operator, skilled or unskilled, to produce precision tapped holes with no danger of damaged threads.

For more data circle 119 on Postpaid Card



Ettco Adjustable Spindle "Knuckle-Head".

April, 1960

...don't use makeshift dogs

BUY RED-E GRINDER WORK HOLDING DRIVERS

**GUARANTEE QUICK
CHANGE-OVERS,
POSITIVE GRIP,
UNMARRED WORK.**

5 TYPES TO CHOOSE FROM

- Steel for extra strength.
- Balanced to prevent chatter.
- Finger tip control on cam action—self-locking.
- Quick adjustments for workpiece dia.

When ordering, please specify Steel or Brass Cams or Screws on Cam Action type.

Ask your distributor, or write for prices and catalog.



CAM ACTION
Steel or brass
cams & screws.
Cap. 1/8" to 4"



REVERSIBLE
Forged steel.
2 jaw sizes on
ea. Replaceable
brass tips
and plates.
Cap. 1/4" to 6".



UNIVERSAL
For plain or
universals.
Replaceable
brass plates.
Cap. 1/4" to 2 1/2".



**CUTTER
GRINDER**
Permits close
face plate
work. Cap.
1/8" to 2 1/2".



STRAIGHT TAIL
Replaceable
brass plates
and tips.
Cap. 1/4" to 6".

IMMEDIATE DELIVERY

CENTER and DOG
Specialists Since 1908



READY TOOL CO.

180 Garfield Ave., Stratford, Conn.
For more data circle 493 on Postpaid Card
MODERN MACHINE SHOP 239

ASTME Tool Show . . .

DRILLING MACHINE

In Booth 1649, Electro-Mechano Co., 265 East Erie St., Milwaukee 2, Wis., will exhibit the Model 604 Drilling Machine.

This air power feed drilling machine operates from shop air line with 3 inch diameter air cylinder, providing a drill thrust of about seven times line pres-

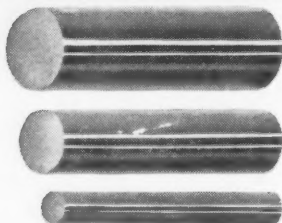
sure. Feed rate is hydraulically controlled and is continuously variable. Threaded adjustable sheaves on the motor and spindle drive provide spindle speeds from 600 to 4,000 r.p.m. The unit comes complete with single or three phase motor, air controls, work light and oil groove table with raising mechanism. It can be obtained with No. 2 Morse taper spindle socket or 1/2 inch chuck. In-line feed cylinder gives more turret at the drill point

for the same size bore, thereby saving air. Because of its moderate cost, the machine is ideal for small shops that want to eliminate operator fatigue or automate shorter run jobs.

For more data circle 120 on Postpaid Card

DELUXE PLUG GAGES by DUNDICK

ONLY
\$1.25
per gage in
lots of 10
or more in
your choice
of sizes



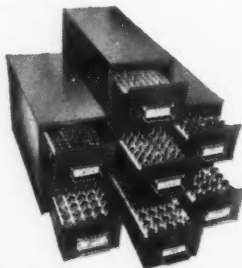
THE GAGE WITH A MILLION USES

Core Pins • Gages • Perforators • Set-up Pins • 2" Long
721 sizes—from .030 to .750

FREE CABINETS

Free cabinets included at no extra cost with each complete or sectional order of the new Dundick DeLuxe Gages.

- Each cabinet complete with lacquered hardwood block. Contains properly identified and sized holes to hold pins.



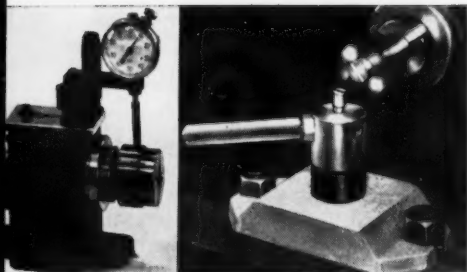
GUARANTEED ACCURACY within a tolerance of plus or minus fifty millionths.

DUNDICK TOOL WORKS, INC.
3410 West 31st St.
Chicago 23, Illinois

For more data circle 494 on Postpaid Card



The Model 604 Drill



(Left) "Centric" Concentricity Measuring Gage and (Right) Chuxrite No. 440 Vise.

COLLETS AND VISES

In Booth 347, Dunham Tool Co., Inc., New Fairfield, Conn., will display the Chuxrite No. 440 rapid action collet vise, which is a low cost holding device for secondary operations on cylindrical parts to $\frac{1}{4}$ inch diameter.

Seven hardened steel collets provide the complete range from $\frac{1}{16}$ to $\frac{1}{4}$ inch. Three adjustable internal stops help speed production when used on drill presses, milling machines, grinders and lathes for drilling, reaming, tapping, milling and grinding.

Also on display will be (1) "Tool Cool," which is a self-contained, portable coolant pump to improve finish and increase tool life; (2) expanding collets for turret lathes and automatic screw machines; (3) "Quadrabar" Adjustable Boring Bar Holder that offers a unique split eccentric bushing that easily rotates to facilitate boring bar height and center adjustment; (4) "Centric" Concentricity Measuring Gage that measures to 0.001 t.i.r., 1 inch from spindle, using present 5C collets or to 0.0005 t.i.r. using selected collets which are available from Dunham Tool Company, Inc.

For more data circle 121 on Postpaid Card

People work better when they SEE BETTER[®] MAGNI-FOCUSER

3-D Girl at SKF

Magni-Focuser multiplies the power of this girl's eyes as she inspects a tiny ball bearing at SKF Industries, Inc.



MAGNI-FOCUSER'S

matched prismatic lenses give needle-sharp magnification. Comfortably light weight. Fits over regular glasses. Leaves both hands free. Normal vision may be resumed by lifting head.

SPEEDS PRODUCTION With Third Dimensional (3-D) Vision Leaves both hands free to work

Magni-Focuser—the binocular magnifier—reduces eye-strain and prevents squinting—thereby speeding production, increasing accuracy and minimizing the chance of errors and accidents.

Gauge reading, layout work, inspection, tool and die work are just a few of the jobs that need the Magni-Focuser. Speeds precision assemblies, blue print work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid.

Magni-Focuser can help your plant produce better. Immediate delivery. 10-day trial without obligation. Return to us if not satisfied. \$10.50.

Send for descriptive folder

Edroy Products Co.

Dept. P, 480 Lexington Ave.
New York 17, N. Y.

For more data circle 495 on Postpaid Card

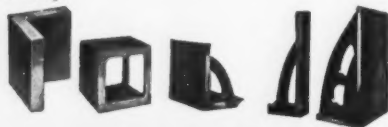
Satisfied?

that it's **PARALLEL?**

... **STRAIGHT?**

... **SQUARE? ... FLAT?**

You will be if you use "Milwaukee" Precision Equipment—Surface Plates, Straight Edges, Angles, Box Parallels. Standard of the industry!



J. C. BUSCH CO.

Engineers & Machinists Since 1907

126 E. PITTSBURGH AVE.

MILWAUKEE 4, WIS.

For more data circle 496 on Postpaid Card

SAVAGE

NIBBLING MACHINES

Patented Tool Holder Assembly →

NIBBLE your COSTS

- No sparks
- No open flame
- No oxidation • No secondary operations

No. 236

Totally enclosed head . . . for safety.
Direct-over-center positive drive . . . gives more power.

One-piece 360° revolving head . . . for fewer parts and longer life.

Write for folder

W. J. SAVAGE CO.
KNOXVILLE TENNESSEE

For more data circle 497 on Postpaid Card

242 MODERN MACHINE SHOP

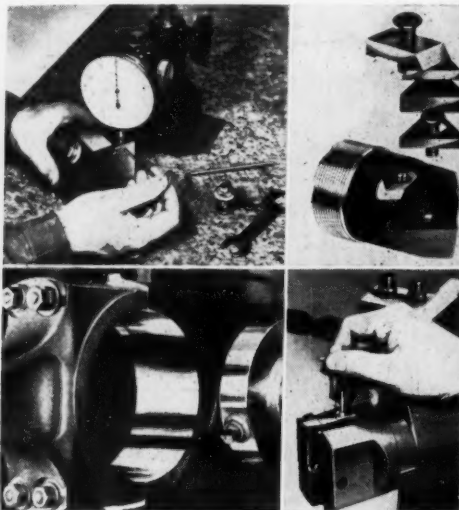
ASTME Tool Show . . .

COMPLETE LINE OF TOOLING

A complete line of products of DeVlieg Machine Co., DeVlieg Microbore Div., Fair St., Royal Oak, Mich., will be on display in Booth 427.

Featured this year will be Microface Adjustable Blade Facing Heads, for boring machines, turret lathes and heavy drilling equipment. Another highlight is titanium carbide and ceramic tipped Microbore Adjustable Tooling that is claimed to cut at speeds and feeds impossible with other type tips, yet yield outstanding surface finishes.

The entire Microbore Tooling System will be on display. It is built around a standard range of multi-purpose single point adjustable tools,



(Upper Left) Microbore System of preset tooling, (Upper Right) Microbore Adjustable Tooling with Kendex Throw Away Inserts, (Lower Left) Microbore Titanium Carbide and Ceramic Tipped Adjustable Tooling, (Lower Right) Microface Adjustable Blade Facing Head.

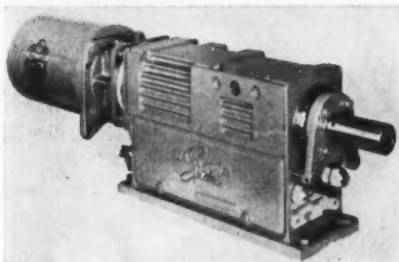
April, 1960

which can be applied to all types of work ranging from one piece jobs to mass production operations with a high degree of efficiency and economy. For more data circle 122 on Postpaid Card

★ modern machine shop ★

VERSATILE AUTOMATIC DRILL UNITS FEATURE SIMPLIFIED CONSTRUCTION

In Booth 1723, Hartford Special Machinery Co., Hartford 12, Conn., will exhibit a new automatic drill unit designed for use—with standard Hartford building block components—in automatic production machines engineered to specific job requirements. Known as the Model 17-400, this new unit features air-hydraulic operation—a system that is said to provide the smooth, positive action and easy adjustability characteristic of all hydraulic systems. The Model 17-400



Hartford Special Automatic Drilling Unit.

is said to contain fewer moving parts, thereby reducing replacements and permitting easier maintenance and greater operating dependability.

Described as ideally suited to jobs requiring versatility and adaptability, the Model 17-400 provides fast, positive adjustment for rapid advance, length of feed, rate of feed and total length of stroke. As optional features,

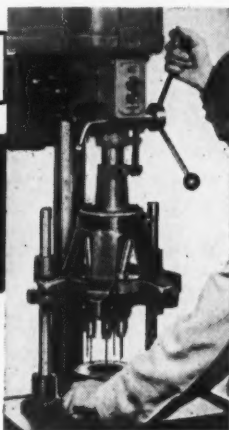


**fully adjustable for dependable
multi-hole drilling and tapping**

**5 models to choose from —
circle or straight line types**

- Chrome nickel universal ball joint type spindles.
- Adapt to any drill press or drilling or tapping unit or machine — Operate in any position.
- Quickly convertible for either drilling or tapping on any drill press.
- Lubricated ball joints with neoprene covers — an Ettco exclusive.
- Tap or drill capacities up to $\frac{5}{8}$ " in steel.
- Precision built, lightweight and compact.

Unconditionally guaranteed for workmanship, material and performance.



Write for complete details today . . . Buy them from your Ettco Distributor

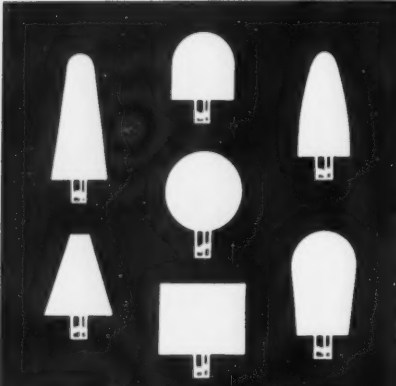
ETTco TOOL & MACHINE CO., INC.

598 JOHNSON AVE., BROOKLYN 37, N. Y.

VISIT BOOTH 1760 AT THE ASTE SHOW

For more data circle 498 on Postpaid Card





**504 Ways to Lick
Tough Finishing Problems**

Paramount **FELT BOBS**

18 sizes, seven shapes, four degrees of hardness — a total of 504 Paramount Felt Bobs always ready to solve your most difficult precision finishing problems. Available with mandrels or unmounted. Finest quality wool felt.

Put a Paramount Bob on the Job

- For polishing surfaces that must be held to close tolerances.
- For buffing or lapping hard-to-reach spots.
- For de-burring and touching up.
- For close-quarter precision finishing on all metal surfaces.

Get better finishes for less cost — "Put a bob on the job." See your Paramount jobber or write for literature. Ask about K-1 and K-2 Bob Assortment Kits that cost far less than buying bobs separately.

K-1 contains 66 pieces \$10.95
K-2 (K-1 plus 4 compound sticks) \$12.95

Bacon Felt Company
11 Fifth Street
Taunton, Massachusetts

For more data circle 499 on Postpaid Card

ASTME Tool Show . . .

provision is made for back feed with independently adjustable rate and for skip drilling and dwell control.

For more data circle 123 on Postpaid Card

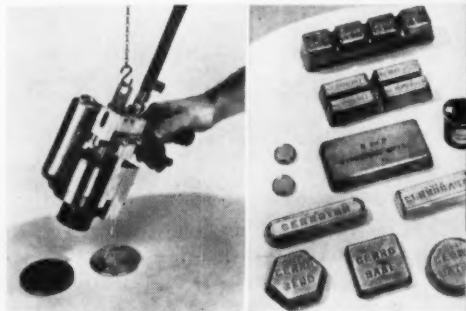
★ modern machine shop ★

ALLOYS AND SPRAYING EQUIPMENT

The unique properties of low temperature melting bismuth alloys, produced by Cerro de Pasco Sales Corp., 304 Park Ave., New York 22, N. Y., will be shown in practical working demonstrations, three dimensional displays and illustrations in Booth 1743.

Included in the demonstrations will be the unusual technique of soldering glass and metal, reproductions of surface finishes and contours using the Fiore Alloy Sprayer, an electric spray gun for metals up to 600 degrees melting point, plus the slush-casting method of producing molds for encapsulating with epoxy resins. The various alloys, Cerrobaze, Cerrobend and Cerromatrix, will be exhibited, along with other spray guns and melting equipment.

For more data circle 124 on Postpaid Card



(Left) Fiore Alloy Sprayer; (Right) Cerro Alloys—Cerrosafe, Cerrocast and so on.

TOOL POSTS, ROTARY TABLES, CALIPERS, PROTRACTORS, GAGES

In Booth 1561, Karl A. Neise, Dept. MM-30, 404 Fourth Ave., New York 16, N. Y., will exhibit the Multifix Quick Change Tool Post. In order to make full use of a modern lathe, a tool post with interchangeable holders is of the greatest importance. It must be possible to exchange the various tools

quickly and accurately. To fulfill this need, the Multifix Quick Change Precision Tool Post has been developed. It consists of a main body (of circular form with 40 ground serrations around a vertical axle), which fits on to the cross slide of a lathe. The individual toolholders, which also have serrations to mate with those on the main circular body, are held against the body by a metal strap, which is activated by an eccentric lever. The movement of this



**CUT THOSE
EXTRA COSTS
THE
New Method
WAY!**

NM Model 500-C
Automatic Roll Marker

DO YOU USE SEPARATE SETUPS FOR STANDARD AUTOMATIC OD MARKING?

Other New Method Automatic Marker Models

NM Model 700—the cut-off marker for custom OD marking.

NM Model 900—Super automatic roll marker for most types of radial end-face marking.

NM Model 600-E—for end-face marking.

★ There's a New Method automatic marker for most marking and identifying requirements, each designed for a specific need.

★ New Method also manufactures a complete line of manually operated marking devices.



SINCE 1931

NEW METHOD STEEL STAMPS, INC.
147 JOS. CAMPAU • DETROIT 7, MICHIGAN

Advantages of Model 500-C

- Eliminates need for separate setups
- Provides easy die change
- Automatic reset
- Adjustable stop for accurate starting position
- Assures uniform depth of impressions on parts
- Drag or scoring of part prevented by starting pad guards

★ Write TODAY for 500-C brochure

For more data circle 500 on Postpaid Card

ASTME Tool Show . . .

lever locks the toolholders to the body or enables the toolholders to be loosened and replaced quickly. The obvious advantages of this design are that an unlimited number of toolholders can be used and, since there are no moving parts, accuracy of repeatability is



Multifix Quick Change Tool Post in use.

GUARANTEED to cut costs PIN-MOUNT CORE DRILL

ALL NEW TWO-PIECE CORE DRILL

DESIGNED FOR
Accurate Flute
Alignment
Greater Flute
Depth
Faster Chip
Removal
Economy

Standards from 3/4" diameter in stock. Specials and carbide tipped cutters to order.

Write for Illustrated Bulletin

METCUT

INDUSTRY'S FINEST END CUTTING TOOLS

METAL CUTTING TOOLS INC., Rockford, Illinois

For more data circle 501 on Postpaid Card

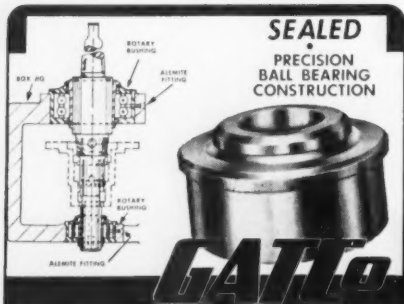


extremely high. Toolholders are available for all machining operations. Guaranteed repeatability is 0.0004 inch.

Walter Tilting-Rotary Tables are available in five sizes, ranging from 10 to 25 inch diameters. The Walter line of dividing heads has been expanded and now includes semi-universal vertical and horizontal-vertical heads, a quick acting head with horizontal spindle and a rigid vertical drilling fixture for certain models.

The Helios line offers a complete variety of precision measuring instruments, conforming to the highest standards of accuracy at economical cost. Over 100 different models of calipers, height and depth gages, protractors, telescoping, small holes and radius gages, parallels and others are available.

For more data circle 125 on Postpaid Card



ROTARY BUSHINGS

FOR DRILLING, CORE DRILLING ROUGH AND FINISHED BORING

The inner race of the GATCO bushing rotates with the tool, piloting the tool accurately below or above the work - or both.

Eliminates expensive tool construction - Reduces tool wear - Prevents seizure and pilot breakage - Especially adapted where precision is required.

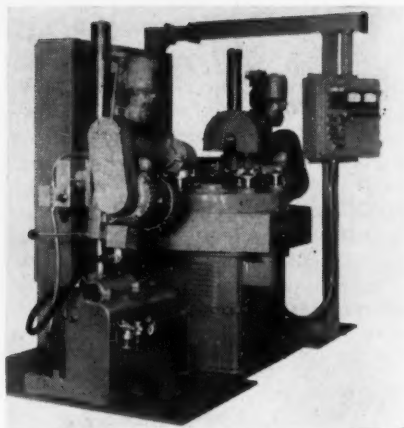
Write for full information and prices

ROTARY BUSHINGS

42336 ANN ARBOR ROAD PLYMOUTH, MICH.

Telephone GLenview 3-2295

For more data circle 502 on Postpaid Card



The Osborn Metal Finishing Machine.

METAL FINISHING MACHINE

Metal finishing machines, designed for use in either semi-automatic operations or completely automated production cycles, will be the keynote of Osborn Mfg. Co., Dept. B-27, Cleveland 14, Ohio, in Booth 1305.

This exhibit will be the company's first public display of its "building block" concept, as applied to metal finishing machines. All of the individual components are interchangeable, so that each machine can be readily adapted to the specific manufacturing requirements which are involved. Osborn will have in operation its

5630-2M1A Automatic Finishing Machine. This unit is built to satisfy the needs of a complete automatic production cycle. The rotary index table spindles hold the workpieces, while from one to four single spindle finishing heads are mounted at various positions around the table. The machine is used to finish parts weighing up to 30 pounds, up to approximately 14 inches in diameter, requiring surface

SAVE - MONEY - TIME - ENERGY



LEXCO HYDRAULIC LIFT TABLES

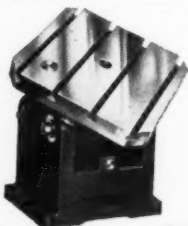
Capacities 500# to 10,000#

Portable, adjustable height, Hand or Foot Operated. For lifting and transporting heavy castings, dies, etc., to machines and Presses.

Also DIE HANDLERS—STRIP STOCK HANDLERS

LEXCO ENGINEERING & MFG. CORP.
20 W. Chestnut St. • Souderton, Pa.

For more data circle 504 on Postpaid Card



SAVE 50% of positioning time

With one set-up on a Cincinnati Gilbert universal table, you can drill at any angle up to 90° on 5 sides of a cube. Provides maximum support of work piece, assures rigidity and accuracy. Table sizes: 22" and 27" square, 22" high. For complete details and specs, ask for Bulletin 850.

Write for

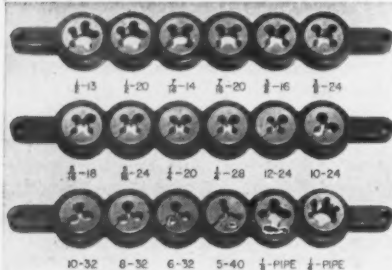


Bulletin 850

THE CINCINNATI **GILBERT** MACHINE TOOL COMPANY • CINCINNATI 23, OHIO

For more data circle 503 on Postpaid Card

THREADING TOOL



CUTS 18 SIZES

1-SET "MOHR
THREADING TOOLS" \$39⁰⁰

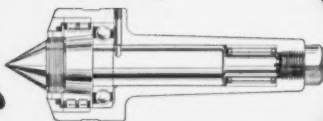
Three precision holders, of high strength aluminum, with 18 high grade adjustable dies. Sizes as shown above. All orders sent on 10 day approval basis. Order direct.

MOHR TOOL & MFG. CO.
BOX 63-H MAYWOOD, ILL.

For more data circle 505 on Postpaid Card

NIELSEN

*Heavy Duty
Live Centers*



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog
M on live centers

NIELSEN, INC. LAWTON, MICHIGAN

For more data circle 506 on Postpaid Card

248 MODERN MACHINE SHOP

ASTME Tool Show . . .

finishing on as many as four different surfaces. A wide variety of finishing tools, such as wire or fibre brushes, buffs and abrasive wheels, can be used singly or in combination on the single spindle finishing heads. In an automated line, production can run as high as 1,000 parts per hour.

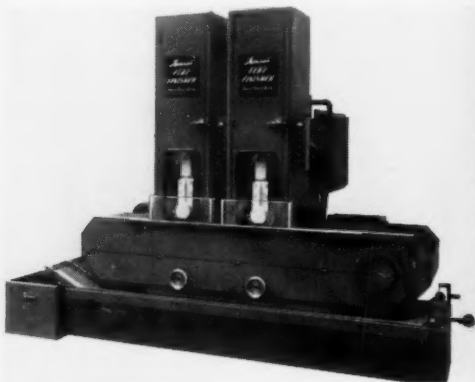
Osborn will also display its latest developments in power brushes for a wide range of metal finishing applications. For more data circle 126 on Postpaid Card

★ modern machine shop ★

GRINDERS AND FLAT FINISHING MACHINES

In Booth 1027, Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo 54, Mich., will display its 6 inch abrasive belt grinder, manual or semi-automatic, with semi-automatic oscillating-tilting table and foot controlled air infeed; electrolytic automatic oscillating 10 inch duplex grinder; and its Model FF-12-2 Flat Finishing Machine, which is shown in the accompanying illustration.

For more data circle 127 on Postpaid Card



Model FF-12-2 Flat Finishing Machine.

April, 1960

LATHES, BORING AND TURNING MACHINES, MILLERS

In Booth 1931, Atlas Press Co., Clausing Div., 2-110 North Pitcher St., Kalamazoo, Mich., will demonstrate geared head lathes, back geared lathes, high speed lathes, tracer lathes, semi-automatic boring and turning machines and vertical milling machines.

Of special interest are the following new machines that will be highlighted in the exhibit: Clausing-Colchester

Geared Head Lathes, equipped for high speed thread cutting, enable the operator to cut threads five times faster than by normal methods, thread tight to a shoulder at maximum speed, cut internal threads without undercutting, eliminate rejects incurred in threading and take full advantage of carbide tooling. The Clausing 12 $\frac{3}{4}$ Inch Hydraulic Tracer Lathe is a highly efficient duplicating lathe that provides automatic reproduction of 90 degree step turning, facing, boring,

Johnson on the job

at JACOBSON
NUT MFG. CORP.



From an interview at
Jacobson Nut Mfg. Corp.
Kenilworth, New Jersey:

"Lower maintenance and less down-time, due to breakdowns, prompted the Company to settle on Johnson Presses for future standardization."



50 models of Johnson Presses

INCLINABLE • STRAIGHT SIDE • GAP • HORN



Special presses built to order.

Complete specifications on all models in our FREE Catalog No. 59. Write today.

JOHNSON MACHINE & PRESS CORP., 620 W. Indiana Ave., Elkhart, Ind.

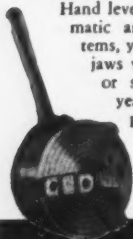
For more data circle 507 on Postpaid Card

LABOR SAVING Production CHUCK

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days.

Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.



Top
Jaws
open

Hand lever closes
and locks while
lathe is running.



Jaws locked

Write for bulletin 201 today.

CHUCK DIVISION

THOMAS HOIST CO.

28 S. HOYNE • CHICAGO 12, ILL.

For more data circle 508 on Postpaid Card

AUTOM



CONTINUOUS HINGES

Manufactured by

**AUTO MOULDING
& MFG. CO.**

WRITE FOR CATALOG

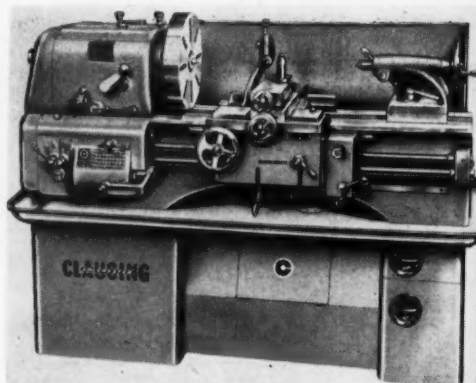
1114 E. 87TH ST.

CHICAGO 19

For more data circle 509 on Postpaid Card

250 MODERN MACHINE SHOP

ASTME Tool Show . . .



The Clausing-Colchester 15 Inch Lathe.

tapers, bevels, grooves, radii, undercuts—reproducing from round or flat templates. The Clausing Vertical Mill machines at all angles with one work setup. The Clausing 18 Inch Heavy Duty Drill Press drills 1 inch in cast iron, $\frac{3}{4}$ inch in steel. Clausing-Colchester 13 and 17 Inch Geared Head Lathes feature larger spindles, hole through spindle capacities and bearings; tapered roller bearings with oil-flow lubrication; enclosed headstock and quick change gear box with oil bath lubrication; hardened gears, spindle nose, separate rod for power feeds; induction hardened bed ways; two speed motor; choice of straight or gap bed.

For more data circle 128 on Postpaid Card

★ modern machine shop ★

FIXTURE CLAMPS AND DIE PAD RETAINERS

In Booth 743, Harco Engineering, 12094 Woodbine Ave., Detroit 39, Mich., will exhibit its full line of fixture clamps and die pad retainers.

The fixture clamp exhibit will fea-

April, 1960



Booth 743 features Harco Die Pad Retainers.

ture one to one clamping ratio with center and end actuated clamping designs. Clamping is accomplished through quick action cams, hand knobs or nut actuated clamping.

Harco Die Pad Retainers provide an efficient method of carrying the weight of large heavy die pads and are especially engineered to stay tight,

even under constant vibration and pounding.

For more data circle 129 on Postpaid Card

★ modern machine shop ★

PUNCHES AND DIES, PUNCH PRESSES AND SHEARING MACHINES

In Booth 805, O'Neil-Irwin Mfg. Co., 306 Eighth Ave., Lake City, Minn., will headline its display with a new 4 foot power shear, a 5 ton power punch press and a new program of adjustable punches and dies.

The new adjustable punch and die program incorporates especially designed die sets with punch and die holders, templates, strippers and gauging devices which combine to perform multiple hole punching in one operation. This tooling can be used over again. It fits any punch press or press brake and has material capacity of 16 gauge mild steel, 1/8 inch aluminum.



**OFFSET
BORING HEADS**



UNPARALLELED

- ACCURACY
- RIGIDITY
- SIMPLICITY
- DURABILITY

REPEAT TO .0001"
IN 30 SECONDS
WITHOUT BACKLASH!
CAN BE ADAPTED
TO FIT ANY
MACHINE

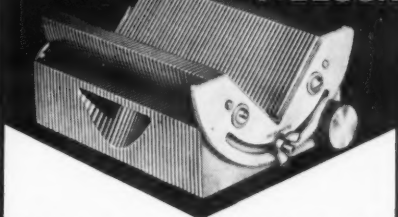
100% GUARANTEED! WRITE FOR CATALOG!

PRECISION

PRECISION TOOL & MFG. CO. OF ILLINOIS
1305 SOUTH LARAMIE AVE., CICERO 80, ILL.

For more data circle 510 on Postpaid Card
April, 1960

MAGNETIC ADJUSTABLE V-BLOCK



This unique precision workholder permits quick and accurate setups, saving time, effort and money in grinding operations.

Unsurpassed for layout, toolroom and production. Can be used on any machine equipped with magnetic chucks.

COMPARE THESE DISTINCTIVE FEATURES:

- Parallelism: $\pm .00005''$ over entire length
- Maximum setting: 90° angle
- Vernier accuracy: ± 15 seconds
- Size: 6" long, $4\frac{1}{2}''$ wide, $2\frac{1}{2}''$ high

Write today for complete technical data to:

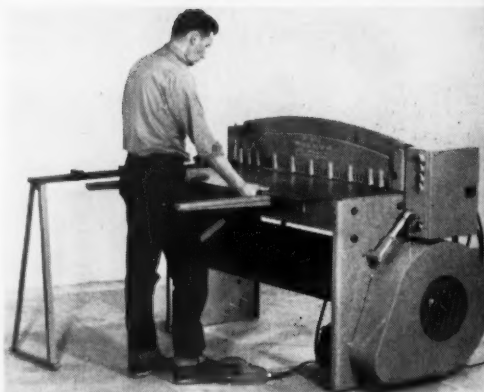
ANTON MACHINE WORKS
1226 Flushing Ave., Bklyn. 37, N. Y.

For more data circle 511 on Postpaid Card
MODERN MACHINE SHOP 251

ASTME Tool Show . . .

The Di-Acro Power Shear No. 48 has an inclined ram and 14 gauge material capacity in mild steel over a 50 inch cutting length. Cutting speeds of up to 160 s.p.m. are possible with this new shear.

Additional design features include a self-adjusting electric clutch, a triple



High Speed Di-Acro Power Shear No. 48.

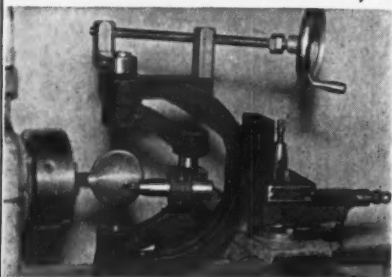
vee belt drive, adjustable material chute, four edged cutting blades, adjustable bed, micrometer back gage and, also, a movable foot pedal.

A 12 inch depth of throat and 1 1/4 inch stroke are standout features of the open back inclinable 5 ton power punch press.

In addition to the aforementioned new products, a representative cross section of Di-Acro benders, brakes, notchers, press brakes, punch presses, rod parters, rollers, shears, spring winders, press brake dies and single station punches and dies will be displayed and demonstrated by O'Neil-Irwin in Booth 805.

For more data circle 130 on Postpaid Card

New RADITURN ✓



CUTS ANY RADIUS Convex, Concave or Ball Patented

The accurate short cut for turning any radius. Adaptable to most any lathe.

Contact your tool supplier or write for details.

RETCO MFG. & SALES

2115 N. Delaware St. • Indianapolis 2, Ind.

For more data circle 512 on Postpaid Card



WHY WASTE TIME?

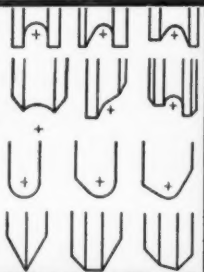
Dress Profiles like these in a few minutes without Templates or Crusher Rolls with the Jeon Automatic Angle Tangent to Radius Dresser. It's fully universal.

Write for Price and Folder.
REPRESENTATIVES WANTED
IN SOME AREAS

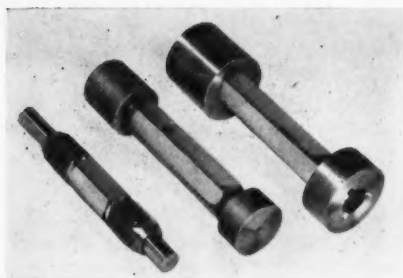
JEON MANUFACTURING CO.

P. O. BOX 6750

WASHINGTON 20, D. C.



For more data circle 513 on Postpaid Card



Booth 938 features Huron Gage Supplies.

CHUCK JAWS AND GAGE SUPPLIES

In Booth 938, Huron Machine Products, Inc., P. O. Box 2274, Dearborn, Mich., will exhibit gage supplies, made to the American Gage Design Standard. These are available for delivery

from stock. Also featured will be soft-blank top jaws, made from 1020 steel. They are designed for use with all chucks with American Standard Master Jaws and are ready for immediate delivery. Special soft-blank top jaws, made to specifications, are available upon request.

For more data circle 131 on Postpaid Card

★ modern machine shop ★

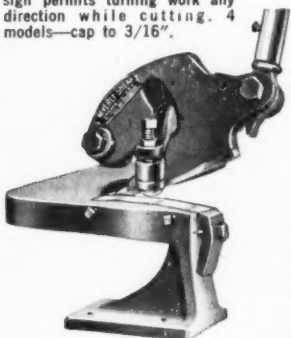
TREPPANNING TOOLS, SPADE DRILLS, RECESSING TOOLS AND BURNISHING TOOLS

In Booth 1826, Madison Industries, Inc., P. O. Box 1137, Providence, R. I., will display tools under actual operating conditions, showing the increased productivity and cost saving advantages of the following: Madison Spade Drills, Madison Trepanning Tools,

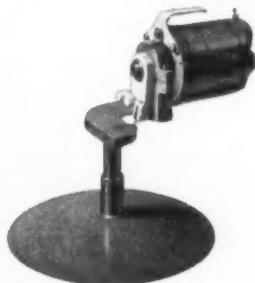
Save Time . . . Labor . . . Materials with BEVERLY METAL CUTTING SHEARS

Throatless SHEAR

Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap to 3/16".



See your Beverly Distributor.
Write for FREE illustrated
Bulletin

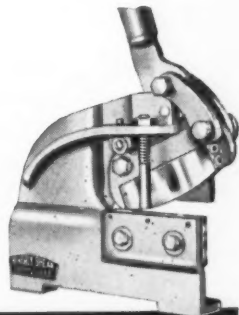


BEVERLY ELECTRIC THROATLESS SHEAR

Powered by heavy duty 115 v. 60 cycle, AC motor to give high speed cutting of any shape. Will cut heavier gauges 15 ft. per minute. Capacity 3-3/16" gauge mild steel. May be used as Bench Shear (as shown) or on floor with addition of column.

Slitting SHEAR

New "SS" Series—easier cutting with compounded linkage. 3 models—cap. to 3/16"; trimming capacity to 1/4" mild.



Beverly SHEAR MFG. CO.

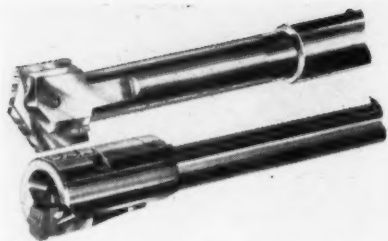
3000 W. 111th STREET • CHICAGO 43, ILLINOIS

For more data circle 514 on Postpaid Card

ASTME Tool Show . . .

Madison Automatic Recessing Tools and Madison-Faessler Roller Burnishing Tools.

The trepanning tools are used to produce a hole from the solid in one pass with a resultant large decrease in machining time required. A core of metal is removed from the part with only a portion of the hole being turned into chips. The Madison Spade Drill is made up of a semi-permanent holder or bar into which replacable cutters can be placed. The assembled unit makes up the spade drill, which can then be used on a radial drill press, turret lathe, automatic or any other similar piece of shop equipment. The automatic recessing tools were designed to eliminate the "cut and try"



Shown (Above) is the Madison Spade Drill and (Below) Madison Trepanning Tool.

methods of manual single point recessing. This tool automatically repeats groove depth and diameter, thereby eliminating the slow, laborious method whereby the operator cuts each groove individually. Microller Burnishing Tools are composed of a series of tapered rolls and a tapered mandrel which are used in such a way that they roll and compress metal to form a dense, long wearing, extremely smooth surface.

For more data circle 132 on Postpaid Card

★ modern machine shop ★

END FINISHING MACHINE AND BENDERS

In Booth 1839, Pines Eng. Co., Inc., 646 Walnut, Aurora, Ill., will show two new bending presses, the Model 3-T Hi-Speed and Model 30-T.

They will be shown for the first



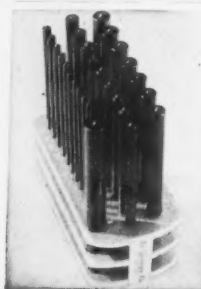
Unconditionally
Guaranteed!

NEW
INSTA
HOLD-DOWN
CLAMPS
"CLAMPS WITHOUT
SHIMS!"
Holds work securely on:
Jig Bore • Planers
Punch Presses • Drill
Presses • Mills • etc.
Write for Bulletin 47-A

2420 Home Place

Dearborn 8, Michigan

For more data circle 515 on Postpaid Card



SPELLMACO "SPOTTERS"

A matched set of transfer punches
for toolmakers, machinists and tool cribs

Used for transferring location of threaded, drilled
and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for
long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes $\frac{1}{32}$ " to $\frac{1}{2}$ ", by
 $\frac{1}{64}$ "—plus handy $\frac{1}{32}$ " size. Length $4\frac{7}{8}$ ". ONLY \$19.40.

Single sizes available

R. L. SPELLMAN CO. • URBANA, OHIO

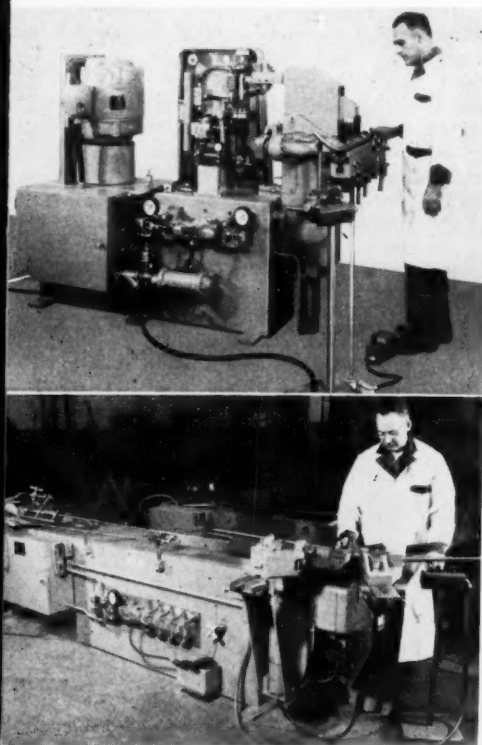
For more data circle 516 on Postpaid Card

time and will be in operation. These presses were designed for fast, progressive bending of tubing, pipe and certain rolled or extruded shapes.

The new Model 660 End Finishing Machine, for simultaneous deburring, facing and chamfering operations, will also be shown for the first time.

In addition, the Model 1 $\frac{1}{4}$ will represent the Pines line of ten series of hydraulic rotary bending machines for demonstration of this fast, accurate method of cold forming a variety of shapes and metals.

For more data circle 133 on Postpaid Card



(Above) Pines Model 3-T Bending Press and
(Below) Model 1 $\frac{1}{4}$ Bending Machine.

April, 1960

PALMGREN Machine Vises and Rotary Tables

There are 64 different models and types of Palmgren vises, rotary tables, milling attachments and other machine tool accessories — the most complete line of vises and tables available anywhere.



No. 84 8"
TILTING, INDEXING
and ROTARY TABLE \$13950



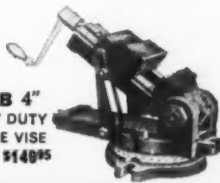
No. 60B 6"
SWIVEL MACHINE VISE \$9955

Used in all industries — everywhere.

Get this **FREE**
Catalog **NOW**



No. 2B 4"
HEAVY DUTY
ANGLE VISE
\$14955



CHICAGO TOOL AND ENGINEERING CO.
8399 S. Chicago Ave., Chicago 17, Ill.

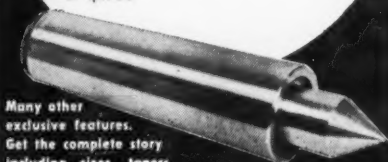
For more data circle 517 on Postpaid Card

ACCURATE! • RUGGED! • RELIABLE!
Specify **nirol**
Spring Loaded LIVE CENTERS

CHECK THESE OUTSTANDING FEATURES:

- Automatically operated take-up for work expansion.
- Minimum overhang. Reduces vibration.
- High radial and thrust load rating.
- Easily accessible for lubrication with any spindle oil.
- All working parts hardened and ground
 - Interchangeable Bell heads. 60° female or special.

Many other
exclusive features.
Get the complete story
including sizes, tolerances
and prices by writing to:



*Reg. U. S. Pat. Off.

nirol MANUFACTURING CO.

901 Highway 22, No. Plainfield, N. J.

For more data circle 518 on Postpaid Card

MODERN MACHINE SHOP 255



RELIANCE
 Angle Dresser \$37.50 Radius Dresser \$57.00
Shipped on 10-day Money-Back Guarantee
 Angle Dresser guide block is hardened and honed, push bar is hardened and ground. Radius Dresser bearing adjustment is lifetime. Both tools are finished in black wrinx enamel. Diamond, \$7.50.
 Several territories open for distributors.
DIAMOND SUPPLY CO. OF AMERICA
 7658 Waukegan Rd., Niles 48, Ill.

For more data circle 519 on Postpaid Card



GEARS
 In Stock—Immediate Delivery
 Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.
 Send for Complete Catalog No. 20
CHICAGO GEAR WORKS
 440-50 N. Oakley Blvd., Chicago 12, Ill.

For more data circle 520 on Postpaid Card

immediate delivery from stock.

GAGE HANDLES & GAGE BLANKS
 MADE TO AMERICAN GAGE DESIGN STANDARDS
 TAPERLOCK TRILOCK REVERSIBLE



Write for FREE Price List Catalog.
HURON MACHINE PRODUCTS, INC.
 P. O. BOX 2274 • DEARBORN, MICHIGAN
 For more data circle 521 on Postpaid Card

256 MODERN MACHINE SHOP

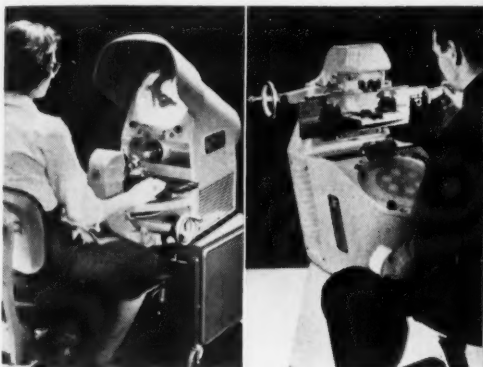
ASTME Tool Show . . .

COMPARATORS AND MEASURING MACHINES

In Booth 1208, Jones and Lamson Machine Co., Optical Comparator Div., 521 Clinton St., Springfield, Vt., will have 13 of its optical comparator and measuring machines set up and operating.

Featured on the various models of the 30 and 14 inch comparators are several relatively new developments of extreme importance to the optical inspection field. These include: new normal reflection units which are said to provide almost unbelievable surface images, even at high magnifications; electronic power elevation that provides fingertip control; a new light concentrator that provides brilliant, reflected images of objects that vary in surface finish; mercury arc light illumination that provides five times the light intensity of the brightest tungsten filament lamps.

The big star of the J and L exhibit will be a brand new model, to be shown for the first time. It is the Model TC-10, described as "a new dimension in the optical inspection field—a small-



(Left) J and L Optical Comparator in horizontal position; (Right) in vertical position.

April, 1960

er machine with great accuracy and versatility." The TC-10 is a 10 inch screen model, but it has big machine stability with machine tool construction, at a weight of 250 pounds. It accommodates 8 by 10 overlay charts—with eccentric chart holders in either the vertical or horizontal position. It has a five power lens that provides 2 inches of lens area. It also accommodates lenses of magnifications ranging from 5 to 125x. It comes with any one of three different staging tables. The standard full measuring table provides a measuring area of 6 square inches. For more data circle 134 on Postpaid Card

★ modern machine shop ★

TOOLS FOR DEBURRING, CHAMFERING, INTERNAL GROOVING

In Booth 2235, Nobur Mfg. Co., 6860 Farndale Ave., North Hollywood, Calif., will exhibit deburring and chamfering tools, internal grooving



Intramatic Model "JA" Tool performing combined operation of machining a snap ring groove and marginal land in aluminum die casting. Tool operates and pilots within a drill jig. The dimensions are closely held and are adjustable to micrometer setting.

NOTHING

heats like ...

is more modern than ...

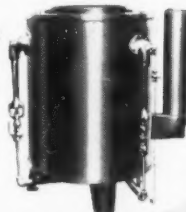
is more economical than ...



INDUSTRIAL GAS BURNERS & FURNACES

for Clean, Fast, Quiet Heat-Up at Lowest Cost!

**BENCH TYPE
OVEN FURNACES**
For heat treating
and pre-heating.
Temperatures to
2000° F.



**ATMOSPHERIC
POT FURNACES**
For cyanide, salt
bath and lead
hardening.
Temperatures to
1650° F.

Write for
complete
"BUZZER"
CATALOG



CHARLES A. HONES, INC.

Est. 1911

141 So. Grand Avenue, Baldwin, L.I., New York • BALDWIN 3-1110

"BUZZER" Burners & Furnaces for Heat Treating, Melting, Soldering

For more data circle 522 on Postpaid Card

ASTME Tool Show . . .

tools, automatic back spotfacing tools and countersinking tools.

Highlighted will be a new series of three models of Intramatic Tools, for application to internal grooving, recessing and back spotfacing. These tools are designed on a different principle and are capable of performing heavy cutting operations without the

limitations normally imposed upon an unsupported boring bar type of cutter. Exceptional range of cutter projection can be obtained. No special outboard bearing or fixturing is required. The tool may be employed in a manner where piloting is established directly within the part. The tool may be equally as well adapted to operate through a drill jig bushing in a sequence following the drilling operation. Pilots and cutters are interchangeable in accommodating varying requirements, and a basic tool model type "JA" will serve a hole size range from $\frac{1}{4}$ to $1\frac{1}{2}$ inches.

For more data circle 135 on Postpaid Card

★ modern machine shop ★

Fisher Benders



A simple, sturdy machine designed to do its work in the easiest way, this bender is made of best quality malleable iron castings and has a hardened steel bending blade.

Capacity: $\frac{7}{16}$ " square or round iron
2" x $\frac{1}{2}$ " channel iron
2 $\frac{1}{4}$ " x $\frac{3}{16}$ " flat iron

Catalog sheets on complete line available.

T. H. LEWTHWAITE MACHINE CO.

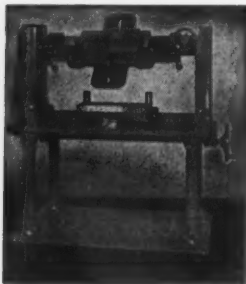
317 East 47th Street New York 17, N. Y.

For more data circle 523 on Postpaid Card

DRILL PRESS AND GRINDER

In Booth 744, Boice-Crane Co., 937 West Central Ave., Toledo 6, Ohio, will exhibit a new type 24 inch all gear drive $1\frac{1}{4}$ inch capacity drill press, which is one of more than 50 models offered in 18, as well as 24, inch sizes. Substituting gear drive for belts enables these presses to drill from 25 to 33 $\frac{1}{3}$ percent larger holes and at greatly faster down feeds.

Many metal, plastic and wood product finishing problems, where contours and vertical surfaces are involved, are solved with the company's oscillating spindle grinder. The scope of its applications was recently expanded when a new detachable spindle system was developed. The oscillating



HAUSER Die Handler

For tool rooms, inspection, press and try-out departments.

Mobile or stationary. 180 degrees rotation of punch. Locks in any position. 24" x 40" base table. Ball bearing construction.

Dealer inquiries invited.

WRITE FOR DETAILS

HAUSER MFG. CO. 234 MILL STREET
ROCHESTER 14, N. Y.

For more data circle 524 on Postpaid Card



(Left) Oscillating Spindle Grinding Machine and (Right) 24 Inch All Gear Drive Drill Press.

spindle is furnished to improve, finish and extend the useful life of the abrasive sleeves.

Numerous band tools make the 14 inch contour saw a three-in-one machine tool. Its compact size and modest cost appeal to the small shop owner. Large plants utilize it wherever the tool must be easily shifted in and out of a temporary production setup, on small workpieces where work is best performed on an approximately sized machine, or on maintenance work where it is desirable to move the machine to the job site.

For more data circle 136 on Postpaid Card

★ modern machine shop ★

BORING TOOLS, KNEE TOOLS, FLUTED TOOLS

In Booth 1004, Kennametal, Inc., Latrobe, Pa., will exhibit a carbide shank boring bar (64½ inches long), with shank of Kennametal, used for boring the powder chamber of 120mm gun tubes at the Watervliet Arsenal.

April, 1960



Model
"400"



**HORIZONTAL
or VERTICAL**

**4"
ABRASIVE
BELT GRINDER**

Eliminate costly hand filing, grinding and deburring. It soon pays for itself. Wet or dry models up to 10" available. Write for bulletin.

Hammond Machinery Builders

1615 DOUGLAS AVENUE KALAMAZOO 56 MICHIGAN

See us at the ASTE Show, Detroit, Booth 1027, April 21-28

For more data circle 525 on Postpaid Card



TAPER PINS



For uniformity and accuracy our Taper Pins are unexcelled. They are milled from special screw machine steel bar stock (or stainless steel or brass), true to taper and to extremely close tolerances. Our leadership in the field enables us to provide all standard sizes from 7/0 to 14 for bulk or assortment shipment. In addition we can furnish, upon request, special needs such as screw ends and dowel pins.

Write for complete catalog giving information on taper pins. Woodruff keys, machine keys and gear rack.

STANDARD STEEL SPECIALTY CO.

BEAVER FALLS PENNSYLVANIA

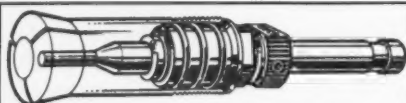
Plants: Beaver Falls, Pa.; Hammond, Ind.

For more data circle 526 on Postpaid Card

MODERN MACHINE SHOP 259

ASTME Tool Show . . .

Other products to be displayed include Kendex Railroad Wheel Boring Tools, which provide indexable round insert tooling to fit standard four tool type "L" boring bars for rough boring railroad wheels; Kennametal Fluted Tools—end mills, burs, reamers, drills and routers—which are



NEW! Self-Centering 5C Collet Stop

Quick friction adjustment. Stays in fixed position. Will not distort collet. Will not move back. Also available for other collets and spindles. 30 days Free Trial. Several Territories Open for Distributors.

Write for Bulletin

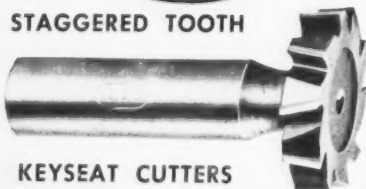
THE BYSTROM COMPANY

6106 Park Ave. So. Minneapolis 17, Minn.

For more data circle 527 on Postpaid Card



STAGGERED TOOTH



KEYSEAT CUTTERS



High speed. Right hand $\frac{1}{2}$ " shank. Diameter from $\frac{1}{8}$ " to $1\frac{1}{2}$ ". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.

WRITE, WIRE OR PHONE

Jobbers' inquiries invited

KEO CUTTERS, INC.

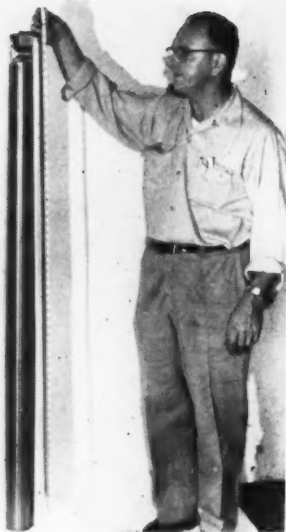
25040 Easy St., Warren, Mich.

Warehouse:

1300 S. Soto St. • Los Angeles 23, Cal.

For more data circle 528 on Postpaid Card

260 MODERN MACHINE SHOP



The Kennametal Carbide Shank Boring Bar.

precision ground from solid Kennametal in a variety of styles and a wide range of sizes in each style; Kendex Inserts and component parts, specially designed for DeVlieg Microbore-Kendex cartridge tooling; Kendex Knee Type Tools for W & S 10 degree reversible cutter holders. They bring the advantages of throw away inserts to overhead tooling for turret lathes, automatic chucking and bar machines; and Kennametal Boring Bars with adjustable and interchangeable heads,

CAMS

MADE TO YOUR SPECIFICATIONS

—Except Screw Machine Cams—

Design Assistance Offered

KIDDE PRECISION TOOL CORP.

15 LOCUST AVENUE ROSELAND, N. J.

For more data circle 529 on Postpaid Card

April, 1960

which utilize the high stiffness of Kennametal to prevent taper, weaving and dragout scoring on precision boring operations.

For more data circle 137 on Postpaid Card

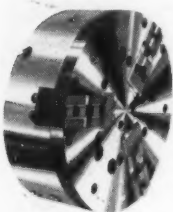
★ modern machine shop ★

CHUCKS AND JAW TURNING FIXTURES

Highlighting Booth 821 of Buck Tool Co., 214 Schippers Lane, Kalamazoo, Mich., is the new 18 inch aluminum body power chuck, with keyway gibs to take up wear, and the new 18 inch serrated jaw turning fixture.

The aluminum chuck, with its specially designed steel top plate and master jaws, is said to provide a 40 percent weight saving—and the gibs are said to triple the useful precision life of the chuck.

The jaw turning fixture, used in conjunction with the Adjust-Tru feature, per-



Buck Power Chuck

mits turning top jaws in the toolroom. Final precision adjustment to 0.001 inch is then made on the chuck under full air pressure with no need for retruing cuts.

For more data circle 138 on Postpaid Card

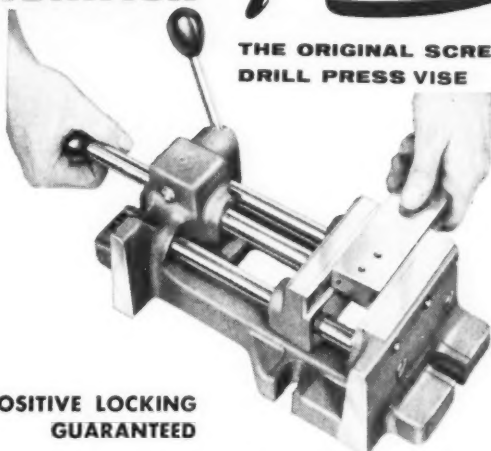
★ modern machine shop ★

CRYSTAL SLICER AND MILLERS

In Booth 604, Robert E. Morris Co., REM Sales, Inc., 5004 Farmington Ave., West Hartford 7, Conn., will exhibit the Nichols Twin Mill, which

heinrich *Grip-Master*

THE ORIGINAL SCREWLESS
DRILL PRESS VISE



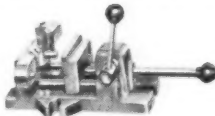
POSITIVE LOCKING GUARANTEED

Some models have sides precision ground square with jaws for machining from 2 or 3 sides. Jaw widths 3", 4", 6" and 8" . . . from 3" to 9" openings.

CUT TOOLING COSTS UP TO 75%



Use the HEINRICH Grip-Master Jig and Fixture Base. Simply add false jaws and bushing plate.



Result . . . an accurate, low-cost Drill Jig.



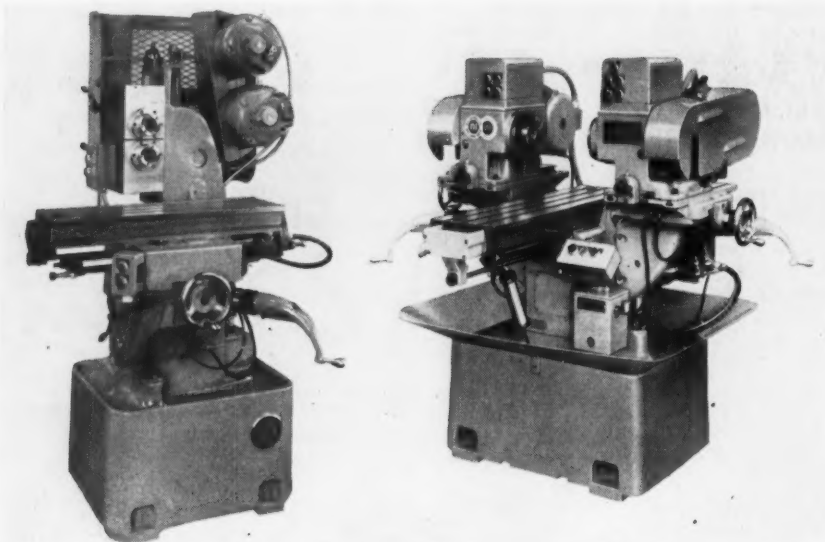
Send for BIG, FREE 28-page catalog.

HEINRICH TOOLS, INC., DEPT. 110-D

Racine, Wisconsin

For more data circle 530 on Postpaid Card

MODERN MACHINE SHOP 261



(Left) Nichols Double Decker Milling Machine and (Right) Nichols Duplex Miller.

has a wide, heavy 36 inch table. It is also provided with 2 h.p. motors for both milling heads to handle heavier cuts over the 20 inch table feed range. The Twin Mill is equipped with a fail-safe electrical system, which automatically returns all the power feeds to their starting positions in the event of power failure.

Also on display will be the Nichols Double Decker Models, which are two

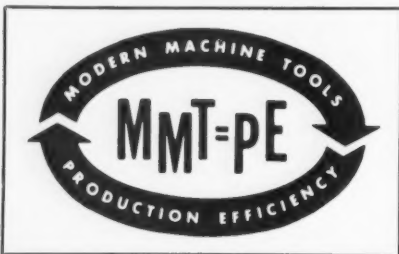
spindle millers that are most valuable for long production runs where simultaneous action of two cutter spindles is practical. These machines are of standard construction, except for the spindle assemblies and electrical equipment.

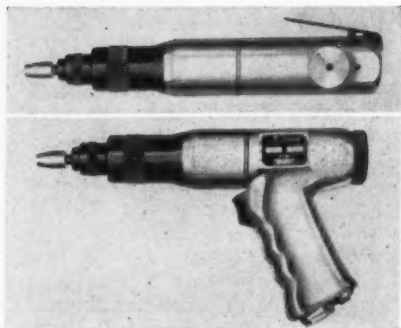
The Nichols Crystal Slicer meets requirements of electronic experts. This compact, automatic precision machine combines a variable feed downward plunge-cut with a synchronized automatic increment cross feed. For more data circle 139 on Postpaid Card

★ modern machine shop ★

PNEUMATIC PRODUCTION TOOLS

Airetool Mfg. Co., Springfield, Ohio, will display pneumatically operated nutsetters, which feature pistol type handle and drive which is easily re-





Two models of Airetool Pneumatic Nutsetters.

versible. All models are available in four speeds and are furnished with either adjustable clutch, positive clutch or direct drive. Reversible screwdrivers feature pistol grip handle with trigger throttle. The Model 400-RA Drill, with fixed 90 degree angle head, is easily operated with one hand. The adjust-

able angle head of the Model 400-AA Drill operates through 360 degrees, simplifies drilling in tight quarters. Heavy duty small wheel grinders were designed particularly for general small wheel grinding on large dies, castings, patterns or other intricate construction. Vertical pneumatic sanders, designed for fine finishing of either flat or contour surfaces, were particularly developed for feather-edge sanding and fine metal finishing. All of these pneumatic production tools will be displayed in Booth 1734.

For more data circle 140 on Postpaid Card

★ modern machine shop ★

CARBIDE TOOLS

In Booth 920, Adamas Carbide Corp., Kenilworth, N. J., will unveil a brand new pictorial product display. It is an effective, visually appealing exhibit design that tells the Adamas

NEW DUAL-SPINDLE **MAXIMAT**

The only multi-functional 10" tool room lathe you'll see at the ASTE show!



Exclusive
Verti-Bed Feature!

**BOOTH
2054**



WRITE FOR LITERATURE

AMERICAN EDELSTAAL INC. / Dept. UD / 350 Broadway, New York 13, N. Y.

For more data circle 531 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 263

ASTME Tool Show . . .

story vividly and convincingly. The new booth embodies the most advanced techniques—color, form, light and motion—in industrial exhibit planning and preparation of products, processes and theme.

One panel area will be devoted to an enlarged photoprint of the present Adamas award winning multi-million

dollar plant; and the expansion program story of the new building addition, now under construction, adjoining the Garden State Parkway. Large transparencies of actual applications—agricultural, automotive, construction machinery, mining and so on—of Adamas carbide products will be featured in the central section of the exhibit and identified, through the use of a rotating flasher-timer, with individual carbide products displayed on a

counter showcase. The full line of Adamas Carbide Tools, toolholders, tool tips, dies, wear parts and powders will also be on display in Booth 920.

Focal point of the exhibit booth will be a brilliant, backlighted, animated pair of eyes, engineered and precision built to alternately open wide and close drowsily in time with the illuminated basic sales theme, "Progressive Carbide Users Select by Performance . . . not habit!"

The Adamas booth will also incorporate important information concerning vital new production techniques and processes, new ideas, new services and new products.

For more data circle 141 on Postpaid Card



free catalog





ALLEN AIR VALVES



Technical catalog (with prices listed) — yours for the asking.

**WRITE
BEFORE
NEXT
TUESDAY**




ALLEN AIR CORP., 255 East 2nd St., Mineola, N. Y.

Name

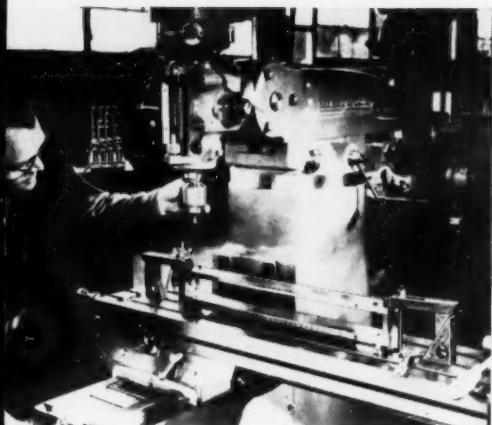
Company

Address

City Zone State

MMS-4

For more data circle 532 on Postpaid Card



Step block and clamps are used in clamping a 5 1/2 inch high fixture to tee slot table.

CLAMPING TOOLS

In Booth 2218, Northwestern Tools, Inc., 119 Hollier Ave., Dayton 3, Ohio,

will introduce aluminum step blocks.

The accompanying illustrations shows how, at the Liebel-Flarsheim Company, Cincinnati, Ohio, step blocks are used for heel supports in clamping a fixture 5 1/2 inches high. This same arrangement will build up to 7 inches high. When the company's clamping requirements are less than 5 inches high, only one-half of a step block is used on each end. A Northwestern Tee Nut and Stud Set is shown in the background. This set furnishes studs, tee nuts, coupling nuts and flanged nuts for any clamping job up to 6 inches high.

For more data circle 142 on Postpaid Card

★ modern machine shop ★

INSTRUMENT MEASURES AND RECORDS SURFACE PROFILES

In Booth 305, Micrometrical Mfg. Co., 345 South Main St., Ann Arbor 7, Mich., will display the Proficorder,

new SCHERR TOOLMAKERS MICROSCOPE

WITH INTERCHANGEABLE DIAL TEMPLETS AND OCULARS

- Reading Angles in Minutes
- Thread Templets for U. S. National Thread Profiles- 6-80 Pitch. Radii Templets, etc.

LARGE MICROMETER DRUMS READ DIRECTLY IN ".0001"

Measuring Range 2" x 2" and other sizes

A moderately priced **PRECISION**
MEASURING TOOL for Toolroom and Inspection

For Complete Information request our 96 Page Catalog —
Contact any of our 4 "Coast to Coast" Locations or your
nearest Local Distributor.



SCHERR-TUMICO

PRECISION MEASURING TOOLS AND INSTRUMENTS

WAREHOUSE STOCK, SHOWROOMS & SALES OFFICES AT
NEW YORK: 200 Lafayette Street, New York 12, N. Y.

ST. JAMES: St. James, Minnesota

LOS ANGELES: 3337 West Olympic Blvd., Los Angeles 19, Cal.

CHICAGO: 5045 W. Harrison, Chicago 44, Ill.

When writing to any of the above locations, refer to DEPT C-4.

For more data circle 533 on Postpaid Card



Every Shop Should Own One



No distortion —
even on $\frac{1}{8}$ " stock!
MODEL "C"

KNURLMASTER Hand Knurler



For small production runs on $\frac{1}{8}$ " to 1" stock. Exclusive screw design gives perfect knurl pattern. Furnished with 3 hardened straight or diamond pattern knurls of standard $\frac{1}{2}$ " dia. Forged steel frame is self-centering. Write for illustrated folder.

ROCKWIN MANUFACTURING CO.

80D MAGNOLIA AVE., WESTBURY, L. I., N. Y.

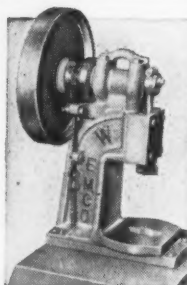
For more data circle 534 on Postpaid Card

EMCO

Power Punch Presses

Emco W—
5 Tons

Emco X—
10 Tons



For punching, forming, stenciling and riveting metal, rubber, leather, plastics. Up to 18000 operations per hour. Big-machine speed, strength, rigidity, accuracy, endurance. Compact, simple in design, fool-proof; quality construction. Thousands of Emco "W" and "X" presses illustrate KLAAS reliability since 1921. Ask for Bulletin "M-4".

The KLAAS MACHINE & MFG. Co.

4334 East 49th Street Cleveland 25, Ohio

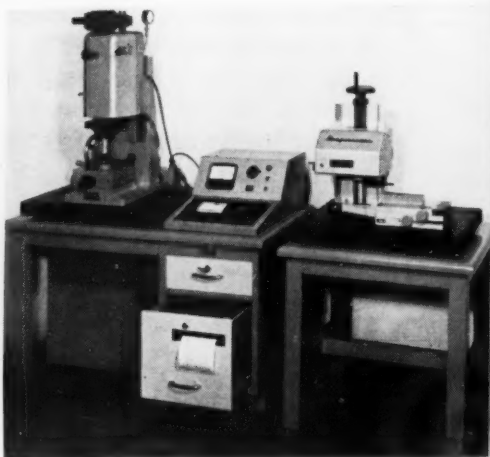
For more data circle 535 on Postpaid Card

ASTME Tool Show . . .

which is an instrument for measuring and recording surface profiles.

The Proficorder is an instrument for research, experiment and production, designed to afford a flexible, accurate means for showing the true profile of practically any machined or finished surface. It produces a pen-drawn chart of the surface that shows the shape, spacing and micro-inch height in accurately readable form. It is intended primarily for use as an inspection and analyzing instrument for production and quality control. Its rugged construction, ease of operation and wide flexibility make it entirely suitable for use in production departments. As an instrument for use in process engineering and research, it provides quantitative data for determining the effectiveness of steps taken to improve certain surface finishes in machining or grinding operations.

For more data circle 143 on Postpaid Card



Rotary and Linear Proficorder in combination.

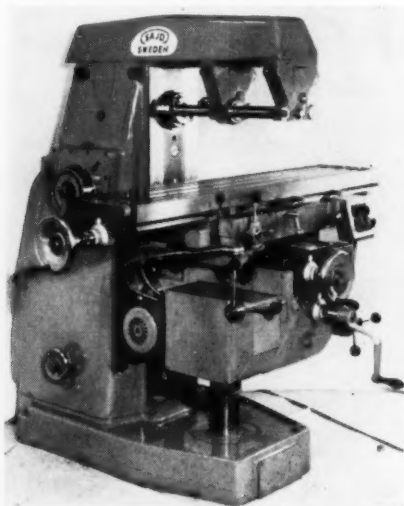
JIG BORERS, GRINDERS, MILLERS AND SHAPERS

In Booth 1850, Austin Industrial Corp., 76-H Mamaroneck Ave., White Plains, N. Y., will exhibit the following machines: MSO Optical Jig Borer, Model PFRL; MSO Universal Grinder, Model FMES; Sajo Model UF-52 Miller with toolmaker's overarm; Sajo Model 54 Automatic Production Miller with automatic table cycling; Sajo Model VF-54-P Vertical Miller with power feed to spindle; VMA Universal Shaper, 26 inch; VMA Standard Shaper, 18 inch.

The following will be exhibited for the first time in the United States: the Sajo Universal Miller, Model 52, with toolmaker's overarm; and the Sajo Automatic Production Miller, Model 54, with automatic table cycling.

Shown on exhibit for the first time east of the Rockies are the MSO Optical Coordinate Jig Borer, Model PFRL, and the MSO Universal Grinder, Model FMES.

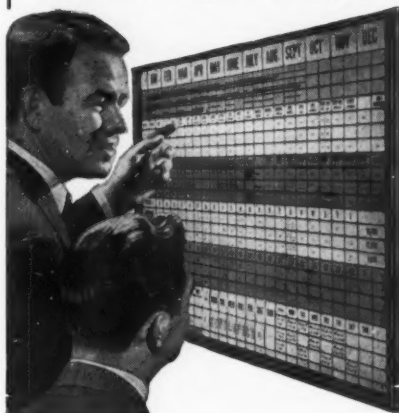
For more data circle 144 on Postpaid Card



Sajo Miller with toolmaker's overarm.

April, 1960

How To Get Things Done Better And Faster



BOARDMASTER VISUAL CONTROL

- ☆ Gives Graphic Picture — Saves Time, Saves Money, Prevents Errors
- ☆ Simple to operate — Type or Write on Cards, Snap in Grooves
- ☆ Ideal for Production, Traffic, Inventory, Scheduling, Sales, Etc.
- ☆ Made of Metal. Compact and Attractive. Over 500,000 in Use.

Complete Price **\$49.50** Including cards

FREE

24-PAGE BOOKLET NO. MS-10
Without Obligation

Write for Your Copy Today

GRAPHIC SYSTEMS

YANCEYVILLE, NORTH CAROLINA

For more data circle 536 on Postpaid Card

MODERN MACHINE SHOP 267

ASTME Tool Show . . .

FIVE CHASER THREADING TOOLS

National Acme Co., Threading Tool Div., 183 East 131st St., Cleveland 8, Ohio, will feature a new line of standard five chaser Vers-O-Tool Threading Heads in Booth 1939. The various uses and advantages of these new tools will be shown by means of display tables equipped with translites and actual

work samples and tools. The basic theme of the display will be based on "more truly round threads." Among the several advantages possible to achieve with these five chaser heads are finishing more pieces per grind, while precision threading over flats, keyways, slots, drilled holes and undercuts; eliminating out-of-round and drunken threads; reduction of lead error, taper and grooves on the thread flank; maintenance of correct relation

between tool and work at all times because of rigid five point contact; and the ability to meet the requirements of the latest improved gauging methods and standards.

In addition to the display items mentioned above, National Acme will demonstrate the actual operation of five Vers-O-Tools on a B.S.A. Single Spindle Automatic Screw Machine. This machine will also be used to obtain comparative results by

COMPARE

and you'll get a **BIG NEW**

J

Johnson

model **J**

HEAVY DUTY METAL CUTTING BAND SAW



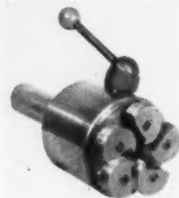
Capacity—10" rounds, 18" flats • Motor— $\frac{3}{4}$ hp (Any voltage available) • Wheel Diameter—16" • Flare Spine— $34 \times 21 \times 8$ • Bed—11" wide, 44" long, 6" deep, 24" high • Overall Height (closed)—29" • Weight—Approx. 750 lbs. • Speeds—24, 90, 150, 190 feet per minute.

COMPARE the handsome, husky Johnson Model J with any metal cutting saw and here's what you'll find:

- Johnson leads the way in dependable, well-engineered, high performance band saws.
- A Johnson saw will cut anything in your stock pile, and do it faster.
- Johnson saws contain more exclusive construction and performance features that save time and money.
- Johnson saws are the finest metal cutting machines available anywhere—and, at the lowest price!

COMPARE . . . and see for yourself how easily you can save time, labor and production dollars with a Johnson saw. Complete information, prices—are yours for the asking.

Johnson MANUFACTURING CORPORATION
Main Plant: 1011 Barnes Street, Albion, Michigan
Eastern Distributor: **R. J. KELLY CO.**, Hale Bldg., 51 Main St., East Orange, N. J.
Midwestern Distributor: **W. Q. LUNDMARK**, 75 N. Broadway, Des Plaines, Ill.
Western Distributor: **HASTINGS DISTRIBUTORS**, 1605 Solano Avenue, Berkeley, Calif.



Vers-O-Tool Head

For more data circle 537 on Postpaid Card

threading with conventional heads and thread rolling with an Acme-Fette thread rolling head. In addition, it will be arranged for pick-up and back threading. Included in the booth will be a display of switches, solenoids and pushbutton control stations, manufactured by the company's Electrical Controls Division.

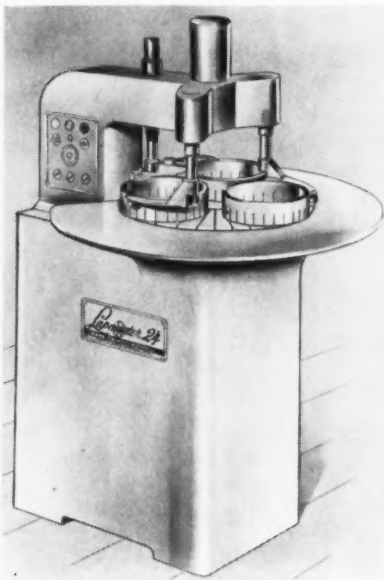
For more data circle 145 on Postpaid Card

★ modern machine shop ★

CONTROL FOR CHECKING LAP PLATE FLATNESS

In Booth 420, Crane Packing Co., Lapmaster Div., Dept. MO-3, 6418 Oakton St., Morton Grove, Ill., will introduce a new control for automatically checking and maintaining lap plate flatness.

This electro-mechanical device, featured for the first time on a new Model 24 Lapmaster Lapping Machine.



Model 24 Lapmaster Lapping Machine.

April, 1960

Greenerd PRESSES ARBOR & HYDRAULIC



- ASSEMBLING
- BROACHING
- FORMING
- STRAIGHTENING

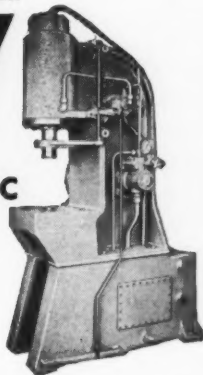
ARBOR
Presses
1 4
to
20
TONS



For 75 years, GREENERD has exclusively manufactured presses for production Assembling, Broaching, Forming, Straightening, etc., sold by Machine Tool Dealers and Mill Supply Houses.

GREENERD Presses may be furnished to J.I.C. standards.

HYDRAULIC
Presses
2
to
75
TONS



See Your Dealer Today or
Write for Greenerd Catalog #554

Greenerd ARBOR PRESS CO
41 CROWN ST. WASHUETA, N.H.

For more data circle 538 on Postpaid Card

MODERN MACHINE SHOP 269

ASTME Tool Show . . .

chine, assures automatic quality control within extremely close tolerances. It incorporates a three point sensing head, capable of detecting errors in lap plate trueness within one light band (0.0000116 inch) on a 3 inch section. If errors are present, the control



SPEEDY-SAFE NON-POISONOUS CASE HARDENING

Indispensable for Tool Rooms, Machine Shops, Schools, etc. Now available in 1, 5, 10, 25, 50 and 100 lb. containers.

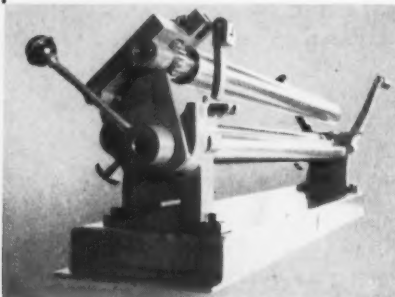
Write for Free Catalog

KASENIT CO.

Est. 1912
81 King St., Mahwah, N. J.

For more data circle 539 on Postpaid Card

NEW! BERKROY SLIPROLLS



NEW CAM LIFT FOR QUICK REMOVAL OF MATERIAL

- Five sizes—12, 18, 24, 30, 36 inch
- 2" Diameter Roll
- Steel Gears
- Oilite Bearings
- Finger Tip Control

Write for complete information

BERKROY PRODUCTS CO.

Div. of King Machine & Mfg. Co.
1171 E. 32nd St., Los Angeles 11, California

For more data circle 540 on Postpaid Card

270 MODERN MACHINE SHOP

unit operates an electric motor drive, automatically shifting the conditioning rings inboard or outboard to compensate for any work wear pattern on the lap plate, eliminating the need for any manual checking and adjustment.

The new Model 24 Lapmaster pumps lapping compound and vehicle under pressure onto the lap plate, assuring efficient distribution over the entire work area. The machine is more compact to permit operation in a smaller space. A large work table surrounds the plate to facilitate loading and unloading. Shape or form of part is no problem. Monel, steel, tool steel, bronze, cast iron, stainless steel, aluminum, magnesium, brass, quartz, ceramics, plastics and glass can be lapped on a production basis within tolerances of one light band or less and micro-inch finishes of 2 to 3 r.m.s. with absolute uniformity.

For more data circle 146 on Postpaid Card

★ modern machine shop ★

HONING MACHINE

A honing machine, designed for production runs, toolroom work and salvage operations and priced within the reach of shops heretofore deprived of automatic honing, will be shown in Booth 1960 by Superior Hone Corp., 1615 Elreno St., Elkhart, Indiana.

This Model "J2" provides infinitely variable spindle speeds from 225 to

70,000 R.P.M. TURBINE AIR GRINDER

GUARANTEED
FULL YEAR

\$4950

complete
including
accessories



Perfect for intricate
tool and die work

NEWAGE INDUSTRIES, INC.
222 York Road Jenkintown 19, Pa.

For more data circle 541 on Postpaid Card

April, 1960

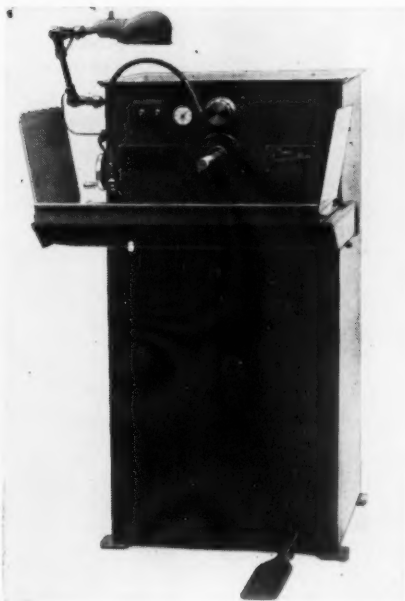
525 r.p.m. (optional range of 450 to 1,050 r.p.m.). It is powered by a 1/2 h.p., 110 volt, 60 cycle, single phase motor.

The complete drive, motor and coolant tank are enclosed in the heavy steel base, the cover of which is louvered to permit adequate ventilation.

Also featured are a tray top, sealed ball bearing spindle, splash guards and anti-splash screen in the coolant tray. The 14 gallon coolant tank is removable for easy cleaning. All of the wiring connects to the main outlet box, so that only one extension cord is required.

Optional equipment includes a dial indicator, full width extension tray and filter tray with three settling baffles and burlap filter.

For more data circle 147 on Postpaid Card



The Superior Model "J2" Honing Machine.

April, 1960

FLUID POWER PRODUCTS

"Adventures in Fluid Power" is an apt description of the various live displays of fluid power products and components that make up the revised Miller "College of Cylinder Knowledge" to be exhibited in Booth 1331 by Flick-Reedy Corp., Miller Fluid

Most Drilling Per Dollar! *Veet* 3 foot RADIAL



Features Found Only In Highest Priced Radials

Finger-Tip Clutching
Automatic Drill Ejector
Push Button Elevation
Centralized Controls

Hardened Column & Way Inserts
Automatic Depth Control
Timken Bearing Column & Spindle
Head Glides on Ball Bearing Rollers

Send for Brochure of Veet's 16 Points of superiority and name of nearest dealer, who will arrange actual demonstration of the Veet Radial, in your plant, without obligation.

See the VEET Radial Drill and the VEET High Pro '30' Speedmiller for Planer Conversion demonstrated, under power, at Booth 904, ASTE Tool Show.

MAFGD. BY *Veet* INDUSTRIES EAST DETROIT, MICH.
Tel. 282-0001 & 1-500

Mfrs. of the VEET High Pro '30'
SPEEDMILLER for Planer Conversions

For more data circle 542 on Postpaid Card

MODERN MACHINE SHOP 271

ASTME Tool Show . . .

Power Div., 7N023 York Rd., Bensenville, Illinois.

Interesting developments in air cylinders, hydraulic cylinders, boosters, accumulators, air-oil circuits, tandem cylinders and pipe-thread fittings are shown, together with live displays of these products in actual use. Each display convincingly drama-

tizes proven product features and methods that are reducing costs, increasing production and eliminating repairs, maintenance and downtime. For more data circle 148 on Postpaid Card

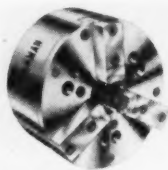
★ modern machine shop ★

CHUCK FOR USE ON AUTOMATIC CHUCKERS

An air operated chuck, designed especially for use on automatic chuck-

ers, is being introduced in Booth 1021 by The Cushman Chuck Co., Hartford 2, Connecticut.

Cushman states that this chuck incorporates many advantages heretofore unavailable in workholding devices used on automatic multiple spindle machines. It features a small overall diameter with an exceptionally large bore capacity and an unusually high lever ratio of 6:1. In addition to ample cross section for strength and precision



The Cushman
Chuck Chuck

new
**U.S. MILLRITE
VERTICAL MILL**
ACCURATE • BIG CAPACITY • RUGGED

\$990*



16" table feed, 12" ram adjustment, 15" vertical knee movement, 8" crossfeed, 4" quill travel. Hard chromed quill, hand scraped and precision ground ways, accurately finished to accepted machine tool standards. Weighs 1100 pounds. Built in Cincinnati to sell for just \$990.00 — less $\frac{3}{4}$ H.P. electricals.*

**ON DISPLAY NEAR YOU
WRITE FOR NEAREST DEALER**

U. S. Burke Machine Tool Co.
3 Brotherton Rd.
Cincinnati 27, Ohio

For more data circle 543 on Postpaid Card

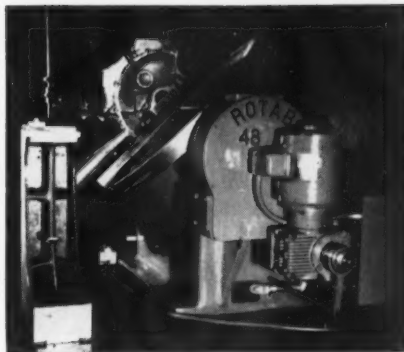
performance, the jaw bearing surface is in line with workpiece grip. All chuck surfaces are hardened and ground, except for soft face and flame hardened ways, thereby providing a long, accurate service life.

For more data circle 149 on Postpaid Card

★ modern machine shop ★

PRECISION ROTARY TABLE

In Booth 657, Machine Products Corp., 6771 East McNichols Rd., Detroit 12, Mich., will exhibit the ROTAB Precision Rotary Table. Basically a universal positioning table, ROTAB offers full 360 degree radial and full 90 degree angular positioning with consistent microscopic accuracy within 5 seconds of true position, and repeatability of settings within one second of arc are standard procedure. In addition, pendant controlled, motor powered tilting and rotation facilitate fast, easy, accurate positioning. Hori-



The ROTAB Precision Rotary Table.

zontal loading, single setup operations improve efficiency to a point where it is said that 50 percent savings in time are not unusual.

In whatever size, from the small 12 inch faceplate up to the monster 84 inch faceplate, ROTAB is a precision

America's
largest selection of
economically priced
**PRESS ROOM
EQUIPMENT**

Durant
TOOL COMPANY
17 Thurbers Avenue
Providence 5, Rhode Island

Our nearby
representatives will
be pleased to be
of service to you
without
obligation.



DOUBLE STOCK REELS
from \$395.00



Motor Driven Stock Straighteners, 13 Models from \$682.

Write for new, free catalog detailing a complete selection of Die Set Pullers, Roll Feeds, Punch Holders, Wire Straighteners, and Standard Stock Straighteners . . . Over 100 necessary pieces of equipment for the modern press room.



STOCK OILERS, 5 Models from \$41.80



Motor Driven Scrap Choppers, 4 Models from \$235.

For more data circle 544 on Postpaid Card

ASTME Tool Show . . .

piece of equipment, assembled with fine craftsmanship, built to provide the ruggedness and durability necessary for almost any operation. The unit might be used to perform inspection, quality control experimental layout or tool room machining.

For more data circle 150 on Postpaid Card

HEIGHT GAGE AND PRECISION SURFACE EQUIPMENT

A new type height gage, which combines in one complete relatively inexpensive unit the functions of both height checking and height measuring equipment, will be featured in Booth 353 by Challenge Machinery Co., Grand Haven, Michigan.

This Height Master Gage has an easily read micrometer scale, from

which readings to thousandths and even ten thousandths can be easily made. Height Master Units are available up to 120 inches high. Also featured will be items of precision surface equipment, including the universal box angle. This combines functions of a right angle iron, box parallel and angle plate in one unit.

For more data circle 151 on Postpaid Card

**First
and
Foremost**

NOBUR'S
Job Tested
TEAM

for

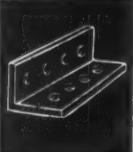
★ **DEBURRING**
★ **CHAMFERING**

the NOBUR



for machine deburring and chamfering of line-drilled and otherwise inaccessible hole surfaces.

for the automatic deburring and chamfering of front and back hole faces simultaneously in sheet metal, etc.



the NOBURMATIC



the NOBUROD



for rapid deburring and chamfering the outer ends of rods, tubes and bosses.

for rapid deburring and chamfering openly accessible hole faces.



the NOBURSINK

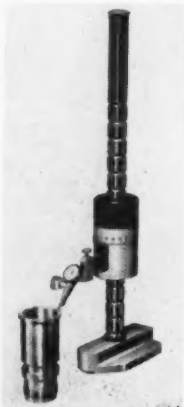


NOBUR MANUFACTURING CO.

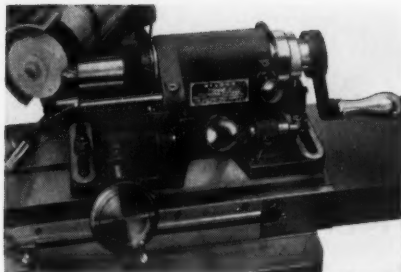
6860 Farmdale Ave., No. Hollywood, California

VISIT OUR BOOTH No. 2235 — A.S.T.E. SHOW

For more data circle 545 on Postpaid Card



Height Master Gage



The Weldon Model "S" Relieving Fixture.

RELIEVING FIXTURE

In Booth 439, Weldon Tool Co., 3000 Woodhill Rd., Cleveland 4, Ohio, will show its Model S Relieving Fixture, which has been primarily designed to produce a modern "S" on twist drills. Capacity of this fixture is from 3/32 through 3/4 inch diameter. The Weldon "S" point is claimed to have several

advantages, including self-centering, better hole finish, more accurate hole size and longer drill life.

In addition to generating this unique drill point, this versatile fixture will also (1) sharpen taps, (2) sharpen Weldon Countersinks and Deburring Tools and (3) relieve angles on step drills. Rapid setups and ease of operation are other features of this addition to the company's line of precision made sharpening fixtures.

Weldon will also display its line of end mills.

For more data circle 152 on Postpaid Card

★ modern machine shop ★

PUNCH PRESSES

In Booth 1722, Service Machine Co., 2310 West 78th St., Chicago 20, Ill., will exhibit the Rousselle line of punch presses. Among the units scheduled to

How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

SLEEVES MADE IN FOLLOWING SIZES:

3-16, 1-4, 5-16, 3-8, 7-16, 1-2, 5-8, 3-4, 1"

STURDY BROACHING SERVICE, INC.

23516 TELEGRAPH ROAD

SOUTHFIELD, MICH.



*Write for
Literature*



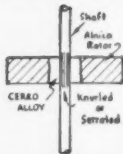
For more data circle 546 on Postpaid Card

ASTME Tool Show . . .

go on display will be the Model 3 Open Back Inclinable Press, equipped with electrically controlled "Econo-Air" friction clutch. Still newer models may be shown, if they are ready at Show time.

Over 30 models of Rousselle Presses, in 5 to 40 ton sizes, are available. All

HOW TO . . . Anchor Shafts in Alnico Rotors, quickly and accurately . . . with **CERRO ALLOYS**



Permanent magnet alternator rotors are securely "keyed" to shafts with bismuth-tin alloys (CERRO ALLOYS). Low-temperature-melting CERROTRU® or CERROMATRIX® is poured into the space between shaft and oversized hole cast in rotor. An alternate method is to completely fill the cored hole with CERRO ALLOY, then drill for a press fit. The aftergrowth of the expanding, solidifying CERRO ALLOY develops a positive holding pressure . . . firmly anchoring the splined or serrated shaft and rotor.



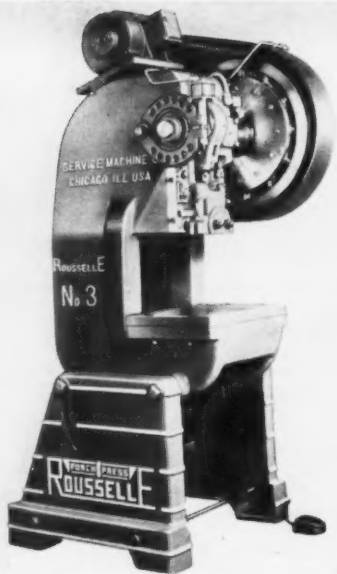
See us at the ASTE Show
Detroit, April 21-28
Booth 1743

CERRO DE PASCO SALES CORPORATION

304 PARK AVENUE, NEW YORK 22, N. Y.

*T.M. Cerro de Pasco Corporation.

For more data circle 547 on Postpaid Card



Model 3 Open Back Inclinable Rousselle Press.

have the same characteristic simplicity and rigid accuracy. All are designed to provide high, uniform output and to keep die wear down to a minimum. For more data circle 153 on Postpaid Card

★ modern machine shop ★

SHIPPING BAGS

In Booth 745, Jiffy Mfg. Co., 360
Florence Ave., Hillside, N. J., will



*You Need an Extra Hand Now
to Speed Up Production!*

HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money too!

IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.

HEIMANN MFG., CO. • URBANA, OHIO

For more data circle 548 on Postpaid Card



Jiffy Shipping Bag has tear tape opener.

display padded shipping bags and Kushion Kraft cellulose wadding. Emphasis will be placed on the completely redesigned Jiffy Padded Shipping Bag complete with tear tape, golden Clupak kraft, hot-melt glue seam and overall bag redesign.

For more data circle 154 on Postpaid Card

★ modern machine shop ★

PRESSES

An actual production job, running on a 40 ton Haver Hi-Production Automatic Press, will be one of the features of the exhibit of Sales Service

IMMEDIATE DELIVERY!

KNOBES LEVERS WHEELS & HANDLES



Cadmium plated, large selection of styles and sizes. Specials on request. Send for FREE catalog.

MACHINE PRODUCTS Corporation

8771 E. MICHIGANS ROAD • DETROIT 12, MICHIGAN

For more data circle 549 on Postpaid Card

April, 1960

Mfg. Co., 2361 University Ave., St. Paul 14A, Minn., in Booth 531. This working exhibit has been arranged through the cooperation of Detroit Controls Company, who are furnishing the job and operator.

Another featured machine is a 40 ton Press-Rite O.B.I. Press with all steel frame that allows generous die

Micro Center Drills & Countersinks



No.	Diameter		Length		Price Each	
	Drill	Body	Drill	Overall	Right Hand	Left Hand
00	0.020"	1/4"	1/4"	1 1/2"	\$1.45	\$1.70
01	0.025"	1/4"	1/4"	1 1/2"	1.20	1.50
0	1/32"	1/4"	1/4"	1 1/2"	1.10	1.35
1	3/64"	1/4"	1/4"	1 1/2"	.95	1.20
2	1/16"	1/4"	1/4"	1 1/2"	1.00	1.20
3	3/32"	1/4"	1/4"	2"	1.00	

60°HSS Available immediately from stock.

Numbers 4, 5, 6 and 7 also on stock.

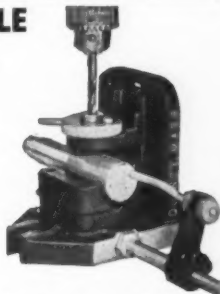
H. KAPP ENGINEERS

66-40 108 St. • Tel: BO 3-8973 • Forest Hills 75, N.Y.

For more data circle 550 on Postpaid Card

ADJUSTABLE DRILL JIG

- eliminates layout
- cuts drilling time



Used for drilling holes through round stock and hex stock from 1/4" to 2" and cap screws from 1/4" to 1 1/4", the new Mathewson Adjustable Drill Jig eliminates layout and can cut drilling time on small lots to a fraction. And it eliminates the costs of special jigs for larger quantities. • Holes for cotter pins, set screws, drive pins for bayonet joints, oil holes in tubular sections, and wiring holes in cap screws, are all typically of the operations that can be done more economically with this jig. Hole diameters range from .052" to .531", using your A.S.A. standard slip bushings. • The hardened V-block has two 60-degree V's for centering round or hexagonal stock, one for 1/4" to 2 1/32" diameter, one for 2 1/32" to 2" diameter. Adjustable stop for locating work longitudinally for drilling any distance from end, may be used on either side. Adjustable bushing carriers hold slip bushings and clamp work securely. • Jig highly successful in permitting use of inexperienced drill operators. For circular write to: Mathewson Machine Works, 40 Hancock St., Quincy 71, Mass.

For more data circle 551 on Postpaid Card


MODERN MACHINE SHOP

277

ASTME Tool Show . . .

area without sacrificing rigidity. This press will be equipped with a Havar Roll Feed and it will be under power.

A third featured machine is the new "Tri-Matic" Oscillating Belt Grinder, which is being shown for the first time. This machine will be operating to demonstrate the aer-tronically con-



**The Leading Machine
Tool Manufacturers
use**

**RUTHMAN
GUSHER**

COOLANT PUMPS

THE RUTHMAN MACHINE CO.

Model
UL 7120 1817 Reading Rd., Cincinnati 2, Ohio

For more data circle 552 on Postpaid Card

RIVETERS . . .

GRANT

**PIONEERS
and
PACEMAKERS
in their
line**



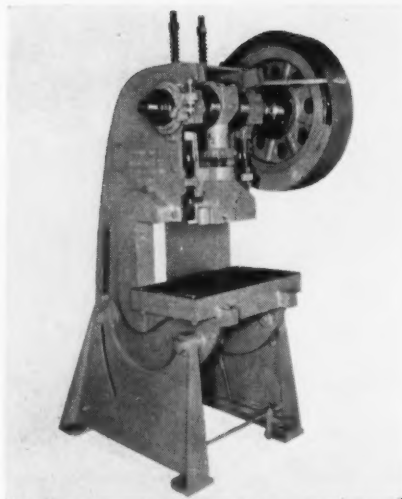


—head rivets from smallest to 3/4" diameter cold steel, either by NOISELESS SPINNING or VIBRATING HAMMER method — fast, economically — types include Vertical and Horizontal Spindles, foot-power or automatic.

Free estimates of your work.
Write for catalog today.

THE GRANT MFG. & MACHINE CO.
96 Sillman Ave. Bridgeport 5, Conn.

For more data circle 553 on Postpaid Card
278 MODERN MACHINE SHOP



The 40 Ton Press-Rite O.B.I. Press.

trolled belt oscillation, fast abrasive belt changing and broad range of applications, such as deburring, grinding, polishing and so on.

Other machines to be shown include an 8 ton Havar Expanded Bed Hi-Production Automatic Press, a 5 ton Press-Rite O.B.I. Floor Model, a 15 ton Press-Rite O.B.I. Deep Throat Press, a Model 3CH Keller Power Hack Saw and a Keller Deluxe Model Die Filer. Also, actual examples of the Havar Cylindrical and Cylindrical

- **PIERCING PUNCHES**
- **BUTTON DIES**
- **STANDARDS • SPECIALS**

Also send Blue Prints for Estimates on
screw machine products and
centerless grinding.

PEMCO PERFORATORS CO.
DIVISION
PORTER MACHINE CO.
CINCINNATI 9 OHIO
30 YRS. SERVING INDUSTRY

For more data circle 554 on Postpaid Card
April, 1960

Type Rams and Ramways will be on display.

For more data circle 155 on Postpaid Card

★ modern machine shop ★

WHEEL DRESSERS, CLAMPS, CENTERS, VISES AND ARBORS

In Booth 2116, J and S Tool Co., Inc., 871 Dorsa Ave., Livingston, N. J., will display (1) complete line of "Fluidmotion" Wheel Dressers, which dress two angles tangent to a radius in one continuous motion with 0.0001 inch accuracy. They will dress most complex forms simply and accurately. (2) J and S All Purpose Jaw Clamps, which eliminate the use of U clamps, straps and fingers. They secure workpieces quickly and rigidly and are easily adapted to box fixtures. (3) Extensive line of J and S Live Centers, which are guaranteed. These self-adjusting live centers are precision built, hardened and ground through-



Fluidmotion Radii and Angle Dresser.

out. (4) J and S Swivel Milling Vise with low mounting, down holding, no hammering, trigger opening and closing features. (5) New J and S "No-Bend" line of detachable milling arbors and adapters.

For more data circle 156 on Postpaid Card

GLENNY ADJUSTABLE KEYWAY PUSH BROACHES

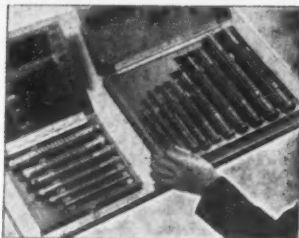


FOR PRECISION KEYWAYS - FAST!

KEYWAYS ACCURATE TO $\pm .0005$ CUT ON YOUR ARBOR PRESS

- a complete self-contained broaching tool;
- cuts accurate keyways on any type of production machine or arbor press;
- eliminates expensive setup time;
- leaves clean, unscored bore and keyway;
- taper on blade and body eliminates shims;
- blades can be repeatedly resharpened;
- safety first—last and always with the Glenny!

Send today for your specification sheet from which you can select broaches you desire. Special widths, diameters, and sharpening—prices and deliveries will be quoted on request.



All parts are manufactured from finest steel, hardened and ground to extreme accuracy—the most economical and practical tool for broaching.

(Manufacturers of Baj and Glenny Broaches)

The BAJ Tool Co., 19751 St. Clair Ave., Cleveland 19, Ohio

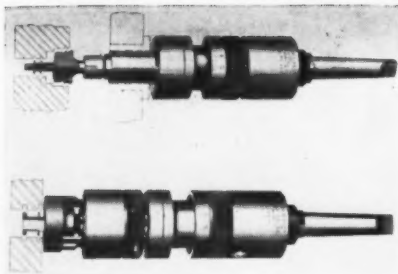
For more data circle 555 on Postpaid Card

ASTME Tool Show . . .

RECESS TOOLHOLDER

A new recess toolholder, available with quick-change adapter for deeper recessing, will be displayed in Booth 831 by Bokum Tool Co., Inc., 14775 Wildemere Ave., Detroit 38, Michigan.

The holder may also be used with standard straight shank cutting tools,



Recess Toolholder has quick change adapter.

.0003 HOLE LOCATION IN ONE MINUTE
Thousands of companies and individuals have proven and accepted our **EDGE FINDERS** for years. Ask for literature with users list and dealer in your area. Hardened and ground on all surfaces including contours for balance. .500" size \$2.50. Deluxe .200" size \$10.00. Vise stop for holding same hole location in several pieces \$2.95.
Above Postpaid Except C.O.D. Charges
OPTICAL TANGENT ANGLE & RADIUS DRESSER \$285.00.
1° TO 90° MAGNETIC ANGLE SQ. PIN ANY DIRECTION BLOCK SET, \$198.00.
GLOVER MFG. CO.
423 PARK AVENUE MEADVILLE, PA.

For more data circle 556 on Postpaid Card

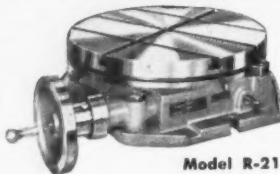
TROYKE

ROTARY TABLES

New
Design

Greater
Precision

Greater
Rigidity



Model R-21

6 Sizes • 8 Models

Guaranteed 60 seconds or less total accumulative angular error. (60 seconds equals .00087" at 6" diameter.)

Write for **FREE** Catalog Number 23.



TROYKE MFG. CO.

11296 Orchard Street
Cincinnati 41 (Sharonville), Ohio

For more data circle 557 on Postpaid Card

280 MODERN MACHINE SHOP

thus reducing inventory requirements for such perishable tools. Operations performed off-jig may be quickly converted to off-part work simply by removing the standard thrust bearing and adapter, substituting the special combination thrust bearing, pilot and quick-change adapter.

For more data circle 157 on Postpaid Card

★ modern machine shop ★

CIRCULAR METAL CUTTING AND SLITTING TOOLS

In Booth 514, Circular Tool Co., Inc., Providence 5, R. I., will display an exceptionally extensive array of its circular metal cutting and slitting tools of all types. Plans call for a "jewel box" presentation of gleaming Circle R tools against a flat background of dull black fabric.

Intention is to acquaint visitors with the wide range of Circular Tool Com-

JIG GRINDING and JIG BORING to your specification

At your disposal: Our sub-contract jig boring department, one of the best equipped in the East.

A. K. TOOL CO., INC.

ROUTE 22, MOUNTAINSIDE, N. J.
Telephone: ADams 2-7300

For more data circle 558 on Postpaid Card

April, 1960

pany production which, according to the company, is comprised of more than 1,200 catalog items. Additionally, the exhibit will include a broad sampling of Circle R "specials," designed and produced to meet specific customer requirements for circular metal cutting projects outside and beyond the capacity of items regularly carried in stock.

For more data circle 158 on Postpaid Card

★ modern machine shop ★

DRILLING AND TAPPING EQUIPMENT

The smallest Multi-Drill and tapping head ever to be produced by Commander Mfg. Co., 4224 West Kinzie St., Chicago 24, Ill., will be among the many production drilling and tapping tools displayed and demonstrated in Booth 313.

The Model 200 Multi-Drill, a two spindle unit designed for close center multiple spindle drilling and tapping jobs, features a full ball bearing drive with special friction bearing spindles and "full face" heat treated spindle drive gearing. It is a rugged production tool, which can be mounted on any drill press or dilling unit, and it can drill a wide variety of hole patterns on a 2 inch diameter circle—the unit's maximum drilling area.

A full complement of standard and special spindles is available and will be demonstrated at the Show.

CAM MILLING JIG BORING



A SPECIALIZED CAM
MILLING SERVICE,
JIG BORING
... SPOT WELDING
... CONTRACT PRODUCTION
EXPERIMENTAL DEVELOPMENT

CAM CALCULATING SERVICE

EISLER ENGINEERING CO., INC.
734 S. 13TH ST., NEWARK 3, N. J.

For more data circle 559 on Postpaid Card

April, 1960

The "Midget" Tapper, only 1-9/16 inch in diameter, is designed to handle taps up to 10-32 in steel and incorporates a pressure sensitive version of the Commander Spring Clutch. The small size and light weight of the Midget permits its use on the smallest drill units.

Another tool to be shown is the Model "A" Multi-Angle Drill Unit, a self-actuating drill unit which may be

SURFACE PLATES

- Layout Plates
- Angle Plates
- Straight Edges
- Parallels

Lawley Surface Plates are made of hand-lapped black granite from 4" x 6" x 1" to 8' x 20'. Accuracies to .00005".

awley Write for folder

GRANITE SURFACE PLATE CO.
2000 WYOMING AVENUE
WYOMING, PENNSYLVANIA

For more data circle 560 on Postpaid Card



TYPE GC

INDUSTRIAL ROLLER BEARING

STANDARD SIZES ARE SHOWN IN OUR
GENERAL CATALOG SENT UPON REQUEST.
SPECIAL SIZES TO ORDER.
... ALSO METAL BALLS ...

THE GWILLIAM COMPANY
Incorporated 1912
358 FURMAN ST. BROOKLYN 1, N. Y.

For more data circle 561 on Postpaid Card

MODERN MACHINE SHOP 281

TOOL AND DIE DESIGN SHOP MATH, MECH. DRAWING



Important courses now available by correspondence. Shop Math and Mechanical Drawing give you basic education you need for industrial work—both are complete, thorough, 100-hour courses. Acme's Tool and Die Design training is recognized as tops for this important, high-pay field! Here is a career opportunity for any qualified man willing to apply himself! Write today for catalog to ACME INST. OF TECHNOLOGY, Dept. 126, 50 S. Jefferson, Dayton 2, Ohio.

For more data circle 562 on Postpaid Card

CAMS

Fully equipped modern machine shop with extensive Jig Boring, Surface Grinding, Horizontal Boring and Thread Grinding facilities as well as modern Cam Milling and Cam Grinding equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.

23-16 44th Road Long Island City 1, N. Y.

For more data circle 563 on Postpaid Card



6" Universal Dividing Head



with
DIRECT INDEXING

Optional SWIVEL BASE converts a conventional dividing head into a universal work head or rotary table. Change-over is accomplished in seconds without tools or wrenches.

Also available in 10" - 12" sizes and in 10" - 12" spiral drive.

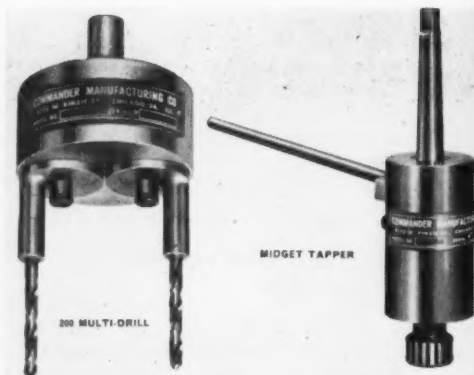
Write for Catalog

CARROLL DIVIDING HEAD CO.

3525 Cardiff Ave. • Cincinnati, Ohio

For more data circle 564 on Postpaid Card

ASTME Tool Show . . .



(Left) Multi-Drill, (Right) Midget Tapper.

adapted to a variety of power sources. Its built-in feed and return air cylinder has a full 4 inch power stroke and any stroke length up to capacity may be preselected. The small size (1½ inch diameter) and long stroke make it ideal for a variety of production drilling setups.

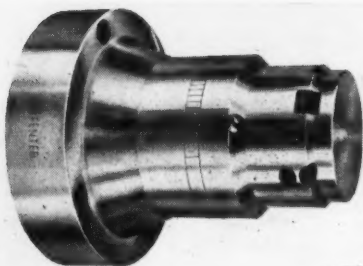
In addition to the aforementioned products, six other Multi-Drill models, six different tapping heads and additional drilling and tapping equipment will be shown.

For more data circle 159 on Postpaid Card

★ modern machine shop ★

SPECIAL BORING QUILLS

In Booth 1365, Briney Mfg. Co., 1165 Seba Rd., Pontiac, Mich., will feature special precision boring quills, demonstrating the flexibility of design possible with the Briney Principle of ultra fine tool adjustment. The Briney Principle allows adjusting tools as close as 0.0001 inch without loosening or tightening screws generally used for holding tool bits in conventionally designed quills. Boring quills which



Briney Special Precision Boring Quill.

have been designed for special applications incorporating the Briney Principle are not limited to single tool adjustment. Various adjustment combinations can be used, as required. Displayed at the exhibit will be quills for o.d. turning, i.d. boring with depth control adjustments, quills with automatic retraction and feed-out and block type tooling for precision i.d. boring and o.d. turning on multi-purpose vertical or horizontal bed

machines. Anti-friction arbor support bearings and bearings that allow spindles to travel in combined linear-radial motion will also be shown, in addition to the complete line of standard quills.

For more data circle 160 on Postpaid Card

★ modern machine shop ★

COMPARATORS, INDICATORS AND GAGES

In Booth 1000, Federal Products Corp., 6143 Eddy St., Providence 1, R. I., will display the following described products.

(1) The Model 100B-40 is an all purpose comparator which permits the user to choose a variety of gaging methods (dial indicator, air, electric or electronic), plus a wide selection of accessories to fill every comparator application, except those involving accuracies in the millionths.

(2) A portable electronic amplifier brings many added advantages to

The best sheet metal ROLLER LEVELER we've ever built!



WOEHR ROLLER LEVELERS

(in several standard models)
flatten steel, aluminum, brass and
copper in widths up to 60"
... in gauges .010 to .125! Your
fabricating capacity and efficiency
are increased *immediately!*
Safe, one-man operation is
simple and accurate.

Send for FREE BOOKLET.
Our brochure gives complete
specifications and data.
Write for your copy TODAY.



f.a. WOEHR machine co.

158 FAVOR STREET • ROCHESTER, NEW YORK

For more data circle 565 on Postpaid Card

Evergreen 3-4835

CUTTER GRINDING SERVICE

END MILLS	SHELL MILLS
to 1/2"60	to 2"1.75
to 1"90	to 3"2.50

also Side Cutters, Slitting Saws, etc.
Send for Price List

JOSEPH KRYZ

TOOL & CUTTER GRINDING SERVICE

P.O. Box 92
Brooklyn 22, N.Y.

175 Oakland St.
Brooklyn 22, N.Y.

For more data circle 566 on Postpaid Card

ABRASIVE CENT-R-LAP TOOL



Saves time, eliminates diamond dressing. Cones changed in seconds. Available in three sizes: 3/8", 3/4" and 1 1/2". Cent-R-Laps and abrasive cones in leading grits. Write for descriptive literature and prices. Sold to consumers only.

J. R. REICH MANUFACTURING CO.
201 E. Stroop Rd. Dayton 29, Ohio

For more data circle 567 on Postpaid Card

WALLS TU-WAY BELT SANDER



Full
1/3 h.p.
G. E. Motor

USE IT
EITHER WAY

VERTICAL

At last, a top quality industrial sander that provides all the most wanted features—yet sells for so little. **\$89.95** complete—with cord, plug, switch ready to use

Illustrated Literature on Request
A few desirable distributor territories still available.

WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

For more data circle 568 on Postpaid Card

284 MODERN MACHINE SHOP

ASTME Tool Show . . .

Electro-Probe Gaging. Much more compact and versatile than former models, the new unit is only 6 1/4 inches wide, 4 11/16 high and 5 1/4 deep, yet everything is contained in the one unit—no separate carrying case is necessary. The precision gage head operates with a gaging pressure of only 2.5 grams, permitting it to be used anywhere in the shop without the need for highly rigid, heavy weight stands.

(3) The Federal Testmaster, Model T-2, features a number of significant design improvements which result in greatly increased sensitivity over previous models. Additional jewelling, redesign of several internal parts plus changeover to a balanced indicating hand greatly reduce friction and contact pressure, making the new Testmaster more accurate, as well as more sensitive. It has a range of 0.008 inch, graduated in units of 0.0001 inch.

(4) The Model 133M-195 is an automatic air-electric gage for control-



(Upper Left) 100B-40 Comparator, (Lower Left) Gaging Unit, (Upper Right) Testmaster T-2 and (Lower Right) Air-Electric Gage.

April, 1960

ling finish size of either straight or tapered diameters on internal grinders and it also controls the dressing cycle of the machine. It can be used in producing diameters as small as $1\frac{1}{4}$ inch and will control size to within plus or minus 0.0001 or better.

(5) A compact control unit for Air-Electric Machine Control Gages, which incorporates all elements formerly housed in three separate enclosures, will be demonstrated in actual use.

(6) The Distometer, Model 555B-245, provides the lathe operator with a faster, more convenient and reliable means of spotting tool position and directly measuring longitudinal cutting distances.

(7) An extremely significant development toward the elimination of dial indicator maintenance is spotlighted in Federal's exhibit of "Miracle Movement" Dial Indicators. All regular Federal Indicators (except super-sensitive and extra long range models) are equipped with "Miracle Movements," so that users can have the advantage of longer lasting accuracy and reduced maintenance costs.

For more data circle 161 on Postpaid Card

★ modern machine shop ★

ROLL FEED, STRAIGHTENING MACHINE, REEL AND POWER WINDER COIL

In Booth 505, F. J. Littell Machine Co., 4163 North Ravenswood Ave., Chicago 13, Ill., will display the following equipment.

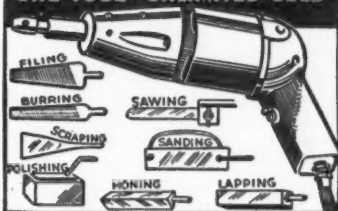
(1) A rack and pinion roll feed mounted on an o.b.i. press. This feed is equipped with disc type brakes for accurate feeding at high speeds. It is also equipped with a running micro adjustment, which will permit adjusting the feed length plus or minus $\frac{1}{8}$ inch while the press is running at full speed.

(2) A roll hydraulic variable speed straightening machine. It is normally

B-R-E-A-K...

Hand Finishing Bottlenecks with Portable Electric Reciprocating Tools

ONE TOOL - UNLIMITED USES



These handy tools will cut out many tedious hand filing and finishing operations—Increase Production—Produce Uniform Work.

Light in weight—Delivers $\frac{1}{8}$ " or $\frac{3}{16}$ " fixed stroke at 1000 strokes per minute—Operates on 110 volts AC or DC.

ACME TOOL CORP.

73 WEST BROADWAY NEW YORK 7, N. Y.

For more data circle 569 on Postpaid Card

HOW TO . . . Bend Thin-Walled Tubing, faster and better . . . with



CERRO* ALLOYS

For bending thin-walled tubing, CERROBEND®... a low-temperature-melting bismuth alloy (CERRO ALLOY)... is the ideal filler. CERROBEND is poured into an inclined tube immersed in hot water, then the loaded tube is removed and rapidly quenched in cold water. Upon assuming shop temperature, the loaded quenched tube can be bent over a forming block or in a regular bending machine. The CERROBEND ALLOY melts out easily in boiling water.



See us at the ASTE Show
Detroit, April 21-28
Booth 1743

CERRO DE PASCO SALES CORPORATION

304 PARK AVENUE, NEW YORK 22, N. Y.

*T.M. Cerro de Pasco Corporation

For more data circle 570 on Postpaid Card

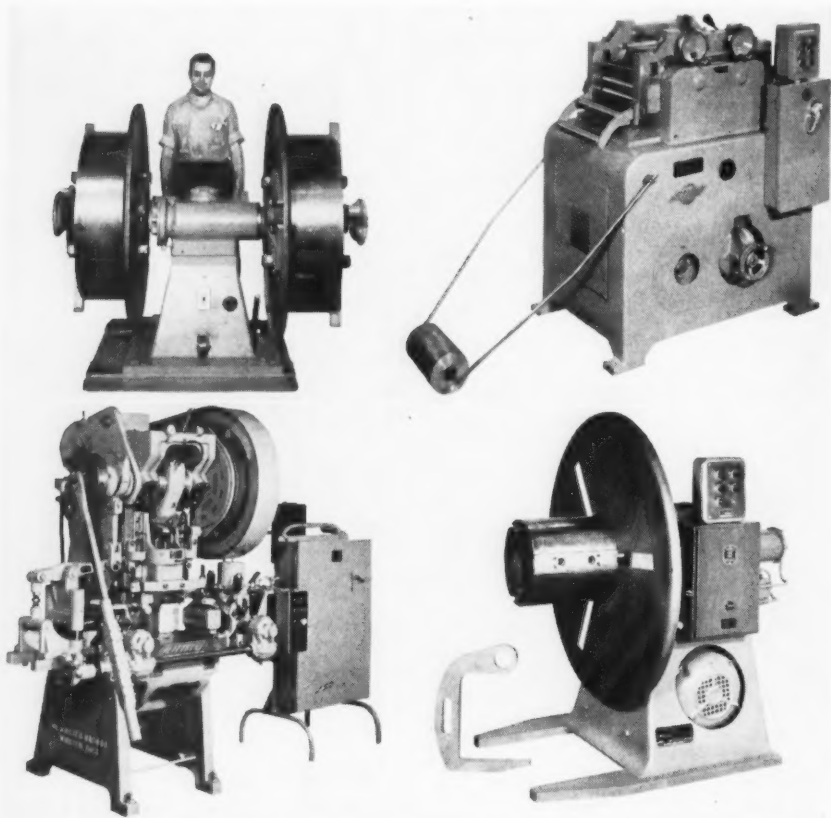
ASTME Tool Show . . .

used for straightening thin stock or for producing very flat stock in heavier materials. It can also be used to straighten parts which have previously been blanked out in punch press operations. The hydraulic variable speed drive permits a speed operation from 0 to 72 feet per minute.

(3) A double automatic centering reel for handling coils weighing up to 2,500 pounds and with a width up to

18 inches. This reel is so designed that a coil on one of the sets of supporting arms can be paying off the stock to the using equipment, while the other side is being loaded. After one coil has been entirely used up, the new coil can be swung into position, ready for operation.

(4) A motor driven rack and pinion type drive straightening and feeding machine for straightening and feeding 0.037 inch thick by 8 inch wide steel stock. This machine will feed 0 to 8½ inches at 60, 90 or 120 c.p.m., to be



(Upper Left) F. J. Littell Double Reel, (Lower Left) Littell Roll Feed, (Upper Right) Littell Straightening Machine and (Lower Right) Littell Power Winder Coil (capacity—2,500 pounds).

equipped with an air operated friction clutch for driving rack and pinion mechanism.

(5) A power winder coil, capacity 2,500 pounds, maximum coil width 12 inches, collapsible 12 inch diameter drum. Opening and closing of 12 inch drum accomplished with an air cylinder used for winding scrap skeleton from punch press operation.

For more data circle 162 on Postpaid Card

★ modern machine shop ★

ROTARY PERMANENT CERAMIC MAGNETIC CHUCK

A new rotary permanent ceramic magnetic chuck, called the Ceramax Rotary Chuck, will be introduced by O. S. Walker Co., Inc., Worcester 6, Mass., in Booth 2242.

The new chuck is so powerful magnetically that it can be used safely for lathe work, as well as grinding. A special "lock" safety feature insures positive magnetic holding under the most rapid start and stop conditions. Variable holding power is provided for easy work positioning. The Ceramax Rotary Chuck also features an all steel top plate. No electrical accessories are necessary.

For more data circle 163 on Postpaid Card



The O. S. Walker Ceramax Rotary Chuck.

April, 1960

Buy Cook "SHUR-GRIP"



LEAD HAMMERS—

They're a MUST in every shop where many blows have to be struck without marring surfaces. Available with "SHUR-GRIP" drop forged handles.

Write for circular and prices

COOK LEAD HAMMER SERVICE

67 MASSASOIT AVENUE, EAST PROVIDENCE 14, R. I.

For more data circle 571 on Postpaid Card

- DRILLS -

Buy Direct **20%** Discount

on all orders over \$20.00

Money Back Guarantee

Finest Sheffield Steel 18% Tungsten Drills outperform ordinary high speed drills by 20% to 500%. Write for price list today.

NEWTOLS, INC. Box 1A
Amityville, L.I., N.Y.
AM 4-5300 **Mr. Pedu**

For more data circle 572 on Postpaid Card

The STEVENS Line SINCE 1925

Introducing NEW series



15" ROTARY TABLE—STD.

ROTARY TABLES _____ 5-8-12-15-18-24" sizes both standard and dial indexing types

ADJUSTABLE TILTING TABLES _____ #0-1-2

COMPOUND TABLES _____ #1-1 1/2-2

ROTARY-COMPOUND TABLES _____ #1-1 1/2-2

INDEX CENTERS—multiple spindle

SPECIAL MACHINES—designed and built

See your dealer or write for bulletins

The John B. Stevens Company
Main Street, Somersville, Conn., U. S. A.

For more data circle 573 on Postpaid Card

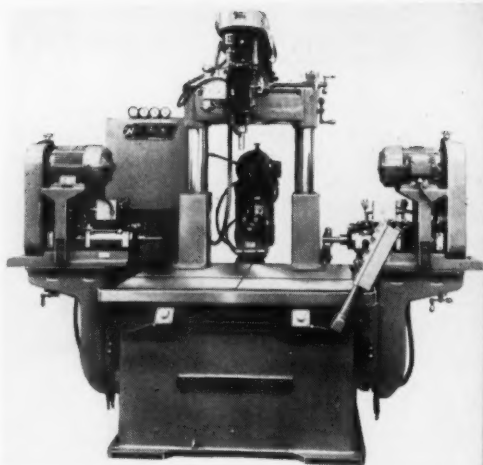
MODERN MACHINE SHOP 287

ASTME Tool Show . . .

MACHINE CAN BE USED FOR DRILLING, TAPPING, REAMING AND BORING

In Booth 621, Wisconsin Drill Head Co., 4983 North 124th St., Butler, Wis., will introduce a new universal machine, known as the "Wismatic" and constructed on the building block principle. This machine can be used for drilling, tapping, reaming and boring, with combinations of the above operations possible. Any combination of four horizontal drill units and one vertical drill unit can be used with additional units readily added on existing machine. Each drill unit is adjustable in the vertical, horizontal and lateral planes.

"Package tooling" is available from the company for a wide variety of piece parts. The advantage of package



The new "Wismatic" Universal Machine.

tooling is that with it this machine can rapidly be changed over from



ZIEGLER FLOATING TOOL HOLDERS

INCREASE TAPPING AND REAMING PRODUCTION

FAST SET-UPS — automatically compensates for misalignment up to $\frac{1}{16}$ " on dia. between machine spindle and work.

Free-Floating, Easy-To-Use Ziegler Tool Holders permit machine operators to maintain production without scrappage due to alignment inaccuracies, eliminate bell-mouthed and oversize holes and keep job set-up costs to barest minimum.

PROMPT DELIVERY

◀ **SIZES** and types to fit all machines used for tapping and reaming.



Hold positive hole location tolerances



**SEND
FOR YOUR
CATALOG
TODAY**

W.M. ZIEGLER TOOL CO.

ROLLER DRIVE FLOATING TOOL HOLDERS

13562 Auburn
Detroit 23, Michigan

For more data circle 574 on Postpaid Card

processing one part to an entirely different part in a matter of a few hours.

Thus, a universal machine of this type, together with the package tooling idea, eliminates the necessity for costly special machines.

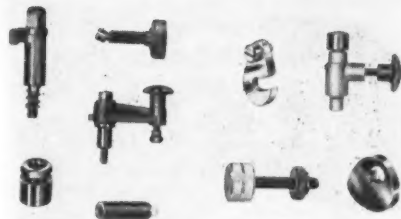
For more data circle 164 on Postpaid Card

★ modern machine shop ★

JIG AND FIXTURE COMPONENTS AND CLAMP ASSEMBLIES

The accompanying illustration shows a few of the jig and fixture components and clamp assemblies which will be shown by Universal Engineering Co., Frankenmuth 9, Mich., in Booth 614.

The complete Universal line contains more than a thousand different items which are available in either regular or stainless steel.

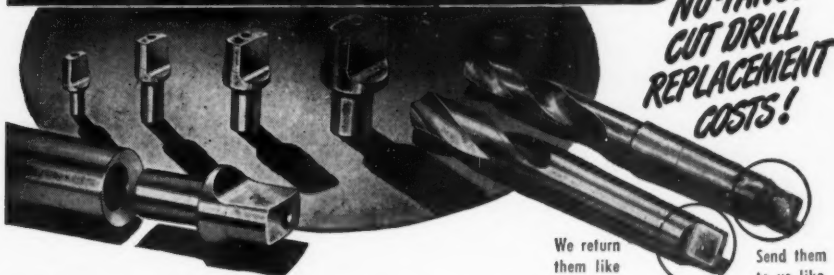


Fixture Components and Clamp Assemblies.

In addition to clamp assemblies, fixture details, spring plungers, torque screws and chuck jaw blanks, the Universal Engineering Company display will include representative examples of standard drill bushings, standard collet chucks, floating chucks, boring chucks, oil coolant chucks, boring bars and the "Kwik-Switch" line of production tools.

For more data circle 165 on Postpaid Card

NEW DRILLS FROM OLD WITH NU-TANGS



Send us your old drills—we'll make them new again at a fraction of the cost of a new drill! Exclusive NU-TANG* process replaces twisted or broken tangs with brand new tangs of correct size—and with **GUARANTEED ORIGINAL STRENGTH**. No welding—No distortion—No shortening of drills—No sleeves.

Any drill, reamer, or other tool with a Morse taper in sizes 2 to 6 can be repaired perfectly this quick new way. Delivery—One week. Used by many leading industrial plants. Amazingly low cost—satisfaction guaranteed! Send for complete information.

* Patent No. 2,512,033

NU-TANGS INC.

1335 Bates Street
Cincinnati 25, Ohio

For more data circle 575 on Postpaid Card

*write
today*

ASTME Tool Show . . .

PRECISION MEASURING TOOLS

Two new precision measuring tools will be exhibited for the first time by Webber Gage Co., 12899 Triskett Rd., Cleveland 11, Ohio, in Booth 240.

An extremely accurate yet low cost optical polygon, made with mirror-like, optically flat chrome carbide reflecting surfaces, is available with

any number of sides from three to 72. It is said to be calibrated to within 0.2 second of an arc. The manufacturer states that it is built to last for many years of hard shop use without recalibration or servicing, as the chrome carbide reflecting surfaces are extremely abrasion and corrosion resistant.

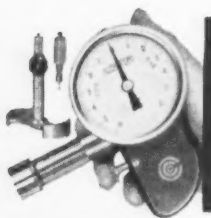
The other product is a "Standard Reference Bar". This is a portable precision yardstick, made of Webber

Rectangular Steel Gage Blocks, permanently wrung and fastened together. Available in lengths from 8 to 37 inches and in two accuracies—plus or minus 0.000005 and plus or minus 0.000002 inch per inch of length—this measuring tool is said to have many important uses in the machine tool industry.

For more data circle 166 on Postpaid Card

Could an **E-X-P-A-N-D-I-N-G PLUG GAGE** *solve a gaging problem for you?*

The Comtorplug expansion principle is unique . . . and proven. Hundreds of U. S. precision-production programs use it, including several of the very largest. The unique expansion plug gives true 2-point gaging. You see actual diameter in a fixed reading to fraction of .0001". You measure front or back taper exactly, also ovality, bell mouth, etc. Centering, alignment and pressure are automatic, allowing accurate use by all types of personnel.



For holes
 $\frac{1}{16}$ " to
10" dia.

*"We've reduced
rejects since
using
Comtorplug"*

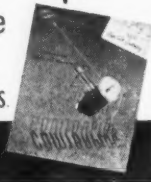


If you produce precision holes in volume

SEND FOR BULLETIN 50

COMTOR COMPANY, 64 FARWELL ST., WALTHAM 54, MASS.

COMTORPLUG



(Above) Webber
"Standard Reference
Bar" and (Below) 36
side optical polygon.

For more data circle 576 on Postpaid Card

IMPROVED "C" CLAMP PAD

Armstrong Brothers Tool Co., 5228 West Armstrong Ave., Chicago 46, Ill., has introduced a new style swivel pad for its deep throat drop forged "C" clamps. The pad cannot be knocked off the clamp, even under the most severe conditions of use. This new pad is attached to the screw by forcing the recessed lip of the pad opening down, thereby forming a solid steel wall which completely encircles the ball of the screw.

The wall prevents the pad's ever coming off during normal use, but allows approximately 40 degrees of swivel in the pad.

These 400 Series Deep Throat Clamps are available in capacities ranging from 0 to 1 1/2 inches through 4 to 12 inches, in both plain and cadmium plate finish. They will be displayed in Booth 760.

For more data circle 167 on Postpaid Card



Armstrong 400 Series
"C" Clamp

ABRASIVE CUT OFF MACHINERY

In Booth 1416, Beaver Pipe Tools, Inc., Abrasive Machine Div., Dana Ave., Warren, Ohio, will exhibit several models of its line of abrasive cut off machinery, including new power head equipment.

These machines will handle shapes up to 6 inches and solids up to 4 inches. They feature speed of cut, which results in labor saving and extra output per hour. The addition of

If it's fine quality Socket Screws

you're looking for...such as

Cap Screws...Flat Heads...

Button Heads...Set Screws

Shoulder Screws...Pipe

Plugs...or Vibration-Proofs

such as "Led-Lok"...

"Saf-Lok"...or Socket Screw

Keys and Kits...Dowel Pins!

...then switch to *Blue Devil*®

SAFETY SOCKET SCREW COMPANY

6519 North Avondale Avenue • Chicago 31, Illinois

Telephone ROdney 3-2020

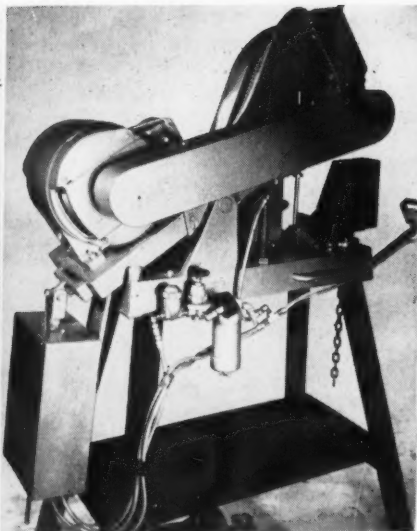
Warehouses at: Los Angeles • Detroit • New Haven • New York City

SOLD ONLY THROUGH AUTHORIZED INDUSTRIAL DISTRIBUTORS

MEMBER ASMA

For more data circle 577 on Postpaid Card





(Left) Wet Abrasive Cutting Machine and (Right) Dry Abrasive Cutting Machine.

the power operating equipment to these machines enables the user to save on cutting costs by using less skilled operators than would be required with manually operated equipment. Wet cutting machines, any angle machines and the No. 14 Dry Cutting Machine, along with others, will be on display. For more data circle 168 on Postpaid Card

★ modern machine shop ★

CHUCKS, CHUCKING UNITS, VISES, JAWS AND VALVES

In Booth 1338, Skinner Chuck Co., New Britain, Conn., will exhibit the following products.

(1) Wedge-Screw Chuck, which utilizes a combination of a pinion gear plate, screw and wedge. It combines all the desirable features of hand and power chucks. It has an accuracy within 0.001 t.i.r., repeatability with-

out adjustment within 0.0005 t.i.r. and unusual gripping power.

(2) Hand Indexing Power Chuck, for holding work that requires multi-surface machining or grinding without releasing. Jaws can be indexed under full pressure without touching the work.

(3) Power Chucking Unit for Brown and Sharpe Automatic and Hand Screw Machines, makes it possible to convert screw machines to air chucking. It is possible to chuck cold drawn and odd shaped parts at higher speeds and at less cost.

(4) Trough Vises made of ductile iron. They feature a large trough for guiding the coolant to return without overflowing.

(5) Line of soft blank top jaws was designed for all chucks made to American Standards. They come in a complete range of sizes in standard, extra

long, extra high and pointed shapes. They are made in serrated and tongue and groove construction.

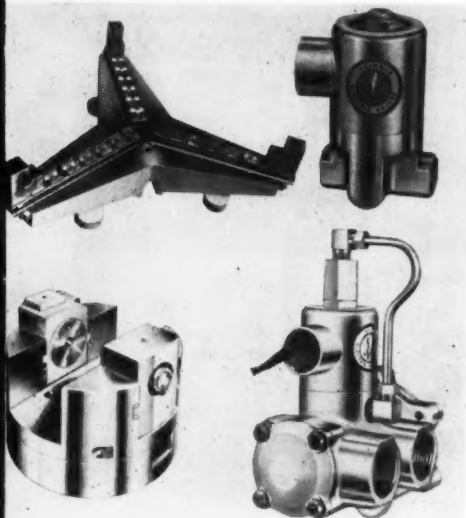
(6) A new special purpose chuck for work holding on welding positioners will also be shown. This chuck is capable of holding work up to 40 inches in diameter.

Sharing Booth 1338 with Skinner Chuck Company, Skinner Electric Valve Division will display a number of new valves.

(1) Complete line of three way valves—A Series—was designed for use with medium size cylinders.

(2) Completing the L Series of two way valves are two new valves with $\frac{3}{4}$ and 1 inch diameter orifices. They were designed to control such common media as air, oil and water. They are both small and compact.

(3) The three way L Series high flow, solenoid valves are claimed to be ideal for general industrial use.



(Upper Left) Skinner Welding Chuck, (Lower Left) Hand Indexing Power Chuck, (Upper Right) R Series Two Way Valve and (Lower Right) Skinner L Series Three Way Valve.

April, 1960

BORING BAR

by
MODERN

**KILLS
VIBRATION,
CHATTER!**



Scientifically designed to diminish vibration in boring, the MODERN boring bar has various size holes drilled from each end to minimize harmonic vibration. Hole diameters were determined by using a VIBRATION METER and probing bar every $\frac{1}{4}$ ". The cavity is filled with shock absorbing material under vacuum, thus obtaining a dead bar of superior strength.

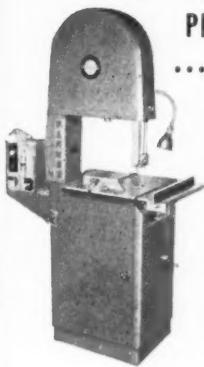
MODERN

MANUFACTURING CO., Inc.
680 Davisville Road, Willow Grove, Pa.

For more data circle 578 on Postpaid Card

The Universal Cutting Machine **PARKS M-2 18" Band Saw**

Cuts **METALS - ALLOYS**
PLASTICS - WOOD
...and it costs
less than \$500!



Here is a rugged, precision-built machine that will cut any materials you work... at the speed best suited for that material—from 50 to 4200 F.P.M. Dual-Range, fully variable gear drive. Priced to fit any shop budget. Write for literature on band saws, wood planers, and radial saws.

The PARKS Woodworking Machine Co.
1511 KNOWLTON ST., CINCINNATI 23, OHIO
Manufacturers of Quality Machines Since 1887

For more data circle 579 on Postpaid Card

MODERN MACHINE SHOP 293

ASTME Tool Show . . .

(4) Two way R Series solenoid valves now include high pressure models in two way, normally closed construction and in a wide range of voltages and frequencies with many electrical options.

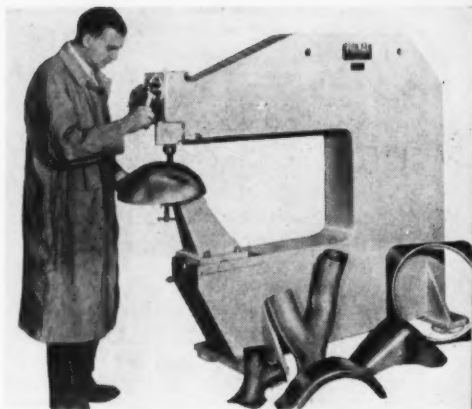
(5) Designed to handle liquids or gasses for control and instrumentation, Skinner will introduce compact two and three way V-5 Series Valves to handle 400 p.s.i. maximum operating pressure differential.

For more data circle 169 on Postpaid Card

★ modern machine shop ★

TRIMMER FOR BULKY STAMPINGS AND DEEP DRAWN PARTS

The heavy duty Pullmax Trimmer/5 will be the feature of American Pullmax Co., Inc., 2465 North Sheffield Ave., Chicago 14, Ill., in Booth 827.



Pullmax Trimmer/5 for deep drawn parts.

The Trimmer/5 was designed for edge trimming and finishing operations on bulky stampings and deep drawn parts. It operates with a stationary lower tool and a reciprocating upper

DRILL HARDENED STEELS WITHOUT ANNEALING —



Use the New
IMPROVED
"HARDSTEEL"
DRILL

With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counterboring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon - high chrome steels of any degree of hardness. "HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly. Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" Drills are cutting costs in thousands of plants.

BLACK DRILL COMPANY, INC.

1372 East 222nd Street • Cleveland 17, Ohio

YOU HARDEN IT —
WE'LL DRILL IT WITH —

"HARDSTEEL"

For more data circle 580 on Postpaid Card

tool that leaves a clean edge, requiring no further finishing. Throat clearance is a total of 23 inches.

The Trimmer/5 has a capacity of 7/32 inch in mild steel. Accessories can be added to this machine so that all standard operations can be performed. Included among these are: straight, circle, inside, irregular, slot and louver cutting, as well as beading, joggling, edge bending, flanging and dishing. Other models of the Pullmax Machine

will also be on display with cutting capacities for 1/16 up to 13/32 inch in mild steel. For more data circle 170 on Postpaid Card

★ m m s ★

DRILL JIG BUSHINGS

In Booth 1309, American Drill Bushing Co., 5107 Pacific Blvd., Los Angeles 58, Calif., will exhibit its complete family of drill jig bushings, including nine different types for plastic tooling, the American Thinwall



American Ceram-A-Grip Bushing

April, 1960

and tungsten carbide drill bushings.

The Ceram-A-Grip Bushing was designed for use in plastic tooling. Bushings are coated with a thin shell of ceramic material (0.020-0.030 thick). The material is fused onto the outer surface of the precision drill bushing, creating a heat barrier that effectively insulates the plastic potting material from any excess frictional heat build-up in the bushing.

For more data circle 171 on Postpaid Card

- • • • •
- **A simple, effective, low cost**
- **ANTI-CORROSION**
- **TREATMENT**
- **during storage, production**
- **and shipment**

CRC

FORMULA 3-36 METALS INDUSTRY

- A molecular film that displaces moisture from grain boundaries, pores and cracks and then seals the surface against corrosion. Easily applied by spray, brush or dip, CRC 3-36 never becomes hard or brittle, normally need not be removed when metal is processed. Non-irritating and non-toxic to humans. Preserves tools, dies and fixtures, loosens "frozen" parts, has a lubricating effect.

WRITE TODAY!

Send for free copy of CRC 3-36 Bulletin for complete product specifications and cost-saving applications.

Available in 16 oz. aerosol cans, 1 and 5 gallon cans and 55 gallon drums for spraying, brushing and dipping.



CRC

CORROSION REACTION CONSULTANTS

116-F CHESTNUT STREET • PHILADELPHIA 6, PA.

For more data circle 581 on Postpaid Card

MODERN MACHINE SHOP 295

ASTME Tool Show . . .

DRILLING, BORING AND TAPPING UNITS

In Booth 2208, Drillmation Co., Inc., 6507 East Eleven Mile Rd., Center Line, Mich., will show the Tapmation, a unit designed especially for tapping and to function equally well with single or multiple spindles with unusual efficiency. The Boremation Unit fulfills all deep hole or gun drilling requirements. The inherent precision qualities of this power unit make it possible to gun drill "finished" holes in one pass, from the solid, eliminating many secondary operations. Drillmation Quill Type Power Units were designed to perform all of the basic drilling operations for the shop or production line. They are available with strokes up to 10 inches and can be used for single or multiple spindles.

The Drillmation Electro-Tape Machine will be on display for the first time during the Show. It was developed to perform super precision machin-

ing operations on workpieces that would prove to be impossible, too costly or difficult to machine using ordinary methods. The machine is capable of performing boring, drilling, countersinking, reaming, tapping or trepanning operations. It can also do gun drilling and gun boring.

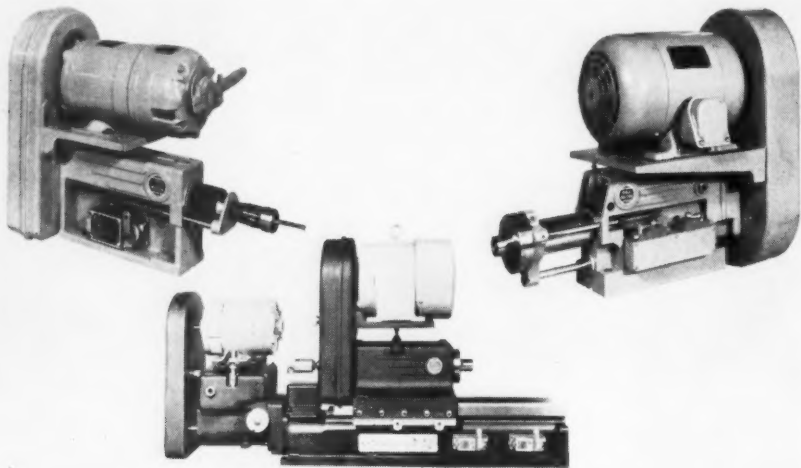
For more data circle 172 on Postpaid Card

★ modern machine shop ★

HEATING MACHINES

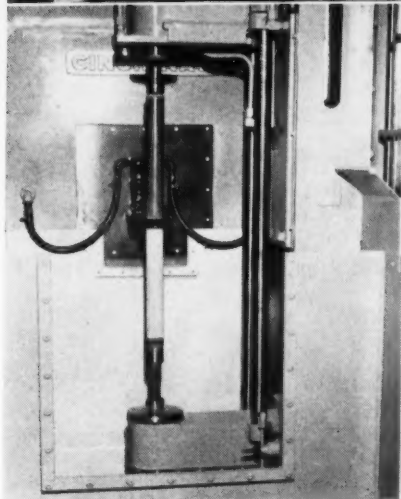
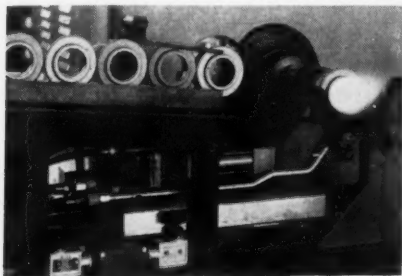
In Booth 504, Cincinnati Milling Machine Co., Meta-Dynamics Div., Cincinnati 9, Ohio, will exhibit the following equipment.

(1) Cincinnati Flamatic equipped with water cooled rotating flame head. Part: automotive stator hub (3.94 inch o.d. and 2.157 inch i.d. of the bore); operation: flame harden bore; material: SAE 1062 steel; hardness: 60-62 Rockwell C with depth of hardness of 0.125 inch; production: 208 parts per 52 minute hour; control cabinet: new compact gas control cabinet for jobs requiring low volume gas flow; prin-



(Left) Tapmation Unit, (Center) Drillmation Unit and (Right) Boremation Unit.

ciple machine feature: water cooled rotary flame head which spins within the area of the part to be heated. This completely automated flame heating machine is tooled up to receive the part by gravity, from an inclined chute, and locate it on the cradle type fixture in front of the flame head. The flame head then advances into the part bore and revolves—selectively heating the i.d. At the completion of the heating cycle, the flame head retracts, the cradle trips forward and the part is dropped into an integral quench tank with conveyor that carries the part out of the tank into a tote pan or part bin.



(Above) Flamatic, (Below) Heating Machine.

April, 1960

GREEN MASTER FEED FINGERS

- No Scoring or Scratching
- Adjustable Grip
- Interchangeable



The
GREEN
Master
Feed Finger for
screw machines
consists of an outer
sleeve, a compressible
rubber insert for gripping the
stock, a tension sleeve for
compressing the rubber in-
sert, and a combined locking
nut and feed tube adapter.
Write for FREE Catalog.

GREEN

MANUFACTURING COMPANY
122 S. PRAIRIE AVE. • ROCKTON, ILLINOIS

For more data circle 582 on Postpaid Card

MODERN MACHINE SHOP 297

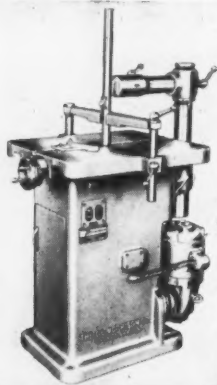
ASTME Tool Show . . .

(2) Cincinnati Motor Generator Inductron Selective Heating Machine—50 kw. Part: frit coated black iron pipe; operation: spin-progress, simultaneously fusing a ceramic coating or frit to both o.d. and i.d. of a pipe 1½ inch in diameter, 24 inches long. This machine design, using the new building block concept, consists of a unit type monitor control station, mounted on an integral heating station. An electrically work driven feeding unit is used to spin-progress the part vertically through the heating coil. Power is furnished by a motor driven, vertical generator, water cooled, "heteropolar" inductor alternating type, without brushes.

(3) Cincinnati 30 kw. Inductron—a high frequency induction heating machine for selective precision heating. For more data circle 173 on Postpaid Card

This new MORRISON KEYSEATER can make money for you

Install it in your shop. Its low cost will amaze you. Watch it pay for itself. You can quickly eliminate costly production tie-ups caused by waiting for expensive outside services. This is not an ordinary keyseater. The Morrison Keyseater is quality built with machine



tool accuracy. Practically anyone can operate it. It has automatic feed, automatic stop to cut off feed at given depths, automatic relief to back the work away from cutters, automatic centering, automatic lubrication. NO BUSHINGS REQUIRED. Cuts keyways 1/16" to 1". FREE new Catalog 714-A shows all features and specifications can be had by writing:

THE D. C. MORRISON CO.
P.O. Box 1017-B
Cincinnati 1, Ohio

For more data circle 583 on Postpaid Card

FABRICATORS, SCREW FEEDER, CLAMPS, PUNCHING AND NOTCHING UNITS

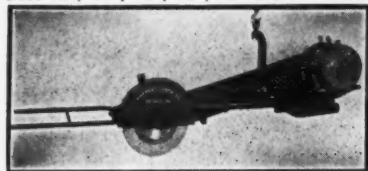
In Booth 1221, Wales Strippit, Inc., 207 Buell Rd., Akron, N. Y., will exhibit the Strippit 15-A Sheet Metal Fabricator, Super 30 Fabricator, Flex-O-Drill, Zipp Screw Feeder, aluminum work holder clamps for use in welding and a complete range of self-contained sheet metal hole punching and notching units.

The Strippit Flex-O-Drill Drilling-Layout Machine, Model 25-B, drills, reams, center punches and scribes. It was designed primarily to produce templates and layouts rapidly and to high standards of accuracy.

The Model 10-AA Strippit Fabricator is a versatile metalworking machine for rapidly and accurately punching, notching and nibbling. It eliminates slow "in-between" tool

MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels



Ask for Descriptive Circular
MUMMERT-DIXON CO.
120 Philadelphia St. • Hanover, Pa.

For more data circle 584 on Postpaid Card

SAVE UP TO 30%



Typical saving per 100 ft. vs. leading brand:

1½" — \$15.39 vs. \$19.04

1½" — \$17.54 vs. \$22.64

Quality backed by Boice-Crane's 50 years in Power Tool manufacturing. Most sizes, types, sets.

Request catalog sheet. • Dealers' inquiries invited.

BOICE-CRANE COMPANY

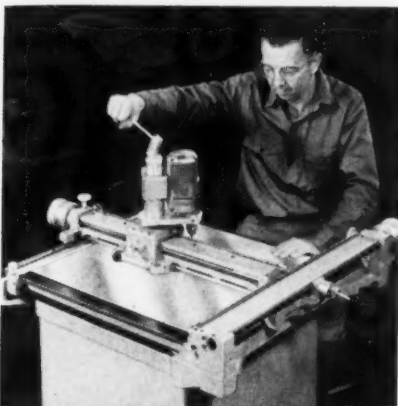
937 West Central Avenue

Toledo 6, Ohio

For more data circle 585 on Postpaid Card

designing and die making for simple and complex fabricating.

Strippit Zipp Screw Feeders, for vertical screwdriving operations, eliminate manual screw placement, speed screw assemblies, reduce errors and rejects, fit all makes of pneumatic and electric tools and they are precision built and factory set. These units save time, cut costs and reduce worker

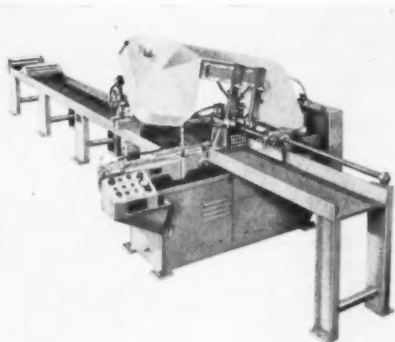


(Above) The Strippit Flex-O-Drill Drilling-Lay-out Machine and (Below) Strippit Fabricator.

April, 1960

PRODUCTION PROVED...

**300% more efficient...
plus greater accuracy**



**Only Peerless
has these big advantages**

- Squareness of cut
- Accuracy of gauging
- Faster conveyor
- Completely automatic, also manual or four speed

Write for literature



PEERLESS MACHINE CO.

RACINE, WISCONSIN

For more data circle 586 on Postpaid Card

MODERN MACHINE SHOP 299

ASTME Tool Show . . .

fatigue, according to the manufacturer.

The Strippit Super 30 Fabricator—30 inch throat depth—was designed for high profit, low cost punching, notching and nibbling, for prototypes and short or medium production runs. Features of this fabricator, include: larger work sizes for more efficiency; adjustable table for greater accuracy and flexibility; new, no-jam electric head eliminates down time; wide range of hole punching capacities; corner and edge notching; straight line nibbling and contour shearing; new swing-shift punch holders; new drop-in die adapter; quick change Strippit tooling system; and Strippit quick set gauging system.

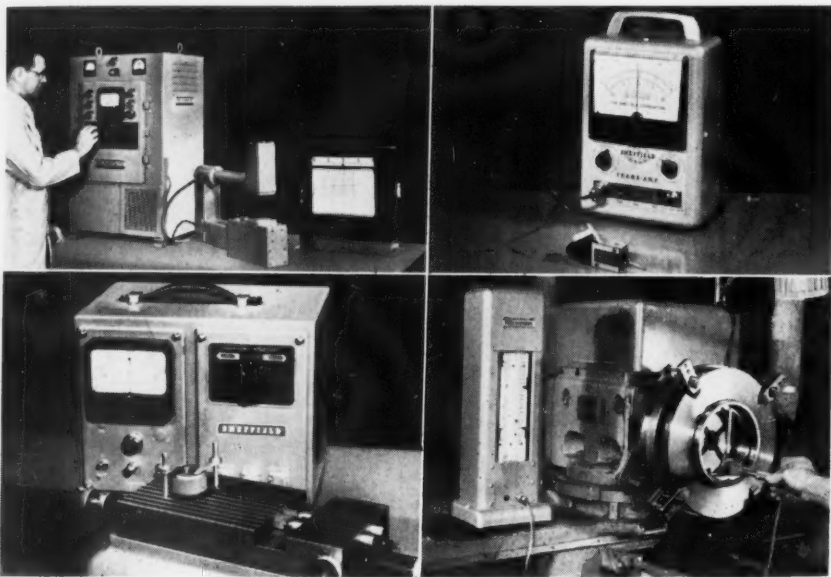
For more data circle 174 on Postpaid Card

MEASURING DEVICES

In Booths 405 and 500, Sheffield Corp., Dayton 1, Ohio, will display the following products.

A new Model 25 PT Measuray x-ray thickness measurement gage will be demonstrated, along with a single pen recorder and a two limit transistorized relay type classifier that can be used to actuate high speed counting, sorting and marking devices and other accessories. Utilizing 60 low-intensity x-ray pulses per second with each pulse of 100 micro-second duration, the Measuray Gage makes instantaneous measurement of continuous strips of plastic films and sheets, ferrous and non-ferrous foils, sheets and bars moving at speeds up to 6,000 feet per minute.

The Unipoint Internal Diameter Measuring Instrument with Accutron



(Upper Left) Measuray X-Ray Thickness Measurement Gage, (Lower Left) Single Stylus Small Holchek, (Upper Right) Trans-Amp Indicator and (Lower Right) Dual Amplification Air Gage.

electronic amplifier features a single gaging stylus. The standard instrument is capable of certifying hole diameters within a range of 0.040 to 1.375 inches. Special smaller size fingers are available on special request in order to enable the instrument to inspect hole diameters as small as 0.020 inch. The instrument can be used to measure taper, out-of-round, grooves and other hole characteristics. Designed to operate without an external power source, the Transistorized Indicator is a small, compact, light-weight, portable, battery operated amplifier with gage stylus. It provides maximum convenience in precision measurement.

Broad tolerance gaging range for "come-up" or approach and higher amplification for final sizing of a close tolerance that spreads "thousandths" over inches of scale length are combined in automatic sequence in the Dual-Amp Precisionaire Instrument. The dual amplification instrument with two indicating columns is connected to the adjustable 3 to 12 inch Airebore Gage by a single air line. Broad tolerance is read on one tube

and the final portion of the full tolerance is viewed in the second higher amplification tube, so that the operator can easily see when the part is within the finish tolerance zone.

Visitors to Booth 500 will see a large variety of Precisionaire Dimensional Comparators and adjustable air gage tooling and fixtures, electronic inspection instruments and devices, air-to-electric automatic machine controls, an automatic post-process gaging ma-

GET EXTRA CAPACITY - EXTRA
FEATURES - EXTRA UTILITY IN

DURO DRILL PRESSES

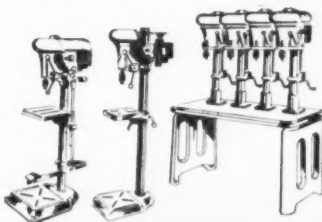
There's a rugged, Duro Drill Press for practically every operation. It is the only line that provides "custom selection" from the largest array of drill press models in the power tool field. You can now buy the drill press you need, with the features you want at no extra cost!

The Duro line includes single and multiple units, with or without production tables and bases, with optional foot feeds, in bench and floor models. Each unit has sealed-for-life ball bearings, precision bored bearing seats, ground alloy spindles, vibration free head castings, sturdy cast hinged belt and pulley guards; adjustable feed tension, table raising mechanism, plus many others.

Send for **FREE**
POWER TOOL CATALOG

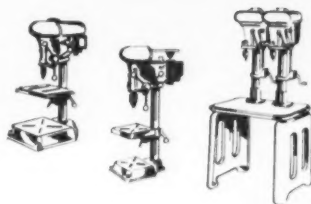


Big 44 page catalog shows complete drill press and power tool line. Reveals important facts on Duro superiority when compared with other advertised brands.



68 Models

Buy **EXACTLY** what you
need in a drill press...
at no extra cost!



DURO Metal Products Co.
2689 NORTH KILDARE AVE., CHICAGO, ILL.

For more data circle 587 on Postpaid Card

ASTME Tool Show . . .

chine and an x-ray measuring the thickness of continuously moving material without contact.

An in-the-press Press-Pacer Transfer Unit, moving a stamping through a series of die stations in a simulated press at each stroke of the ram, will be demonstrated in Booth 405.

For more data circle 175 on Postpaid Card

MAGNETIC DIE RETAINER UNITS

New, lower priced, punch and die retainer units for Whistler Magna-Dies have been developed by S. B. Whistler and Sons, Inc., 740 Military Rd., Buffalo 23, N. Y. They will be demonstrated in action for the first time in Booth 1339.

Because the new design represents a decrease in overall size, more holes can now be pierced in one operation

in many instances. This can cut punching operations in half, according to the manufacturer. The retainers can be used with all existing Magna-Die equipment.

Punches and dies are stocked in 0.001 inch increments from 0.100 through 0.500 inch in diameter. For more data circle 176 on Postpaid Card

**... WE TAPPED 12,240 # 2-56
HOLES 1/2" DEEP
WITHOUT BREAKING
A TAP!***

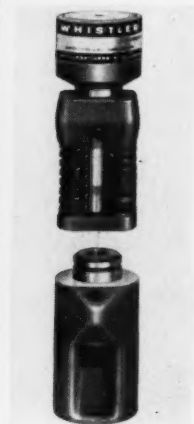
(actual size)



Workpiece is a complex aluminum aircraft part in which 119 holes, ranging in size from #50 to 1/4" were drilled and tapped. A large percentage of the holes were bottom drilled and tapped. *Midwestern customer's name on request.

TAPMATIC Tapping Attachments can mean radically reduced tap breakage in your tapping operations. LITERATURE ON REQUEST.

TAPMATIC corporation
845 W. 16th Street Costa Mesa, California



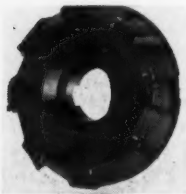
Perforating Punch
Die Retainer Units

For more data circle 588 on Postpaid Card

POSITIVE ANGLE MILLING CUTTERS

In Booth 931, McCrosky Tool Corp., Meadville, Pa., will display typical samples of its "Jack-Lock" Milling Cutters: Series 900 Cutters for milling with throw away carbide inserts; thin slotting cutters; "Super" Adjustable Reamers; turret tool posts; "Wizard" Quick Change Chucks; boring bars; and specially engineered multiple operation tools that permit two or more related operations to be performed with just one tool and one setup.

In addition, the company will display, and introduce for the first time, a new line of positive angle cutters for milling with throw away carbide inserts. The manufacturer states that these new cutters incorporate many of the same job-proved features of the company's negative angle tools. The body, of two piece construction, per-



McCrosky
Milling Cutter

mits the triangular inserts to be nested on accurately ground surfaces in 60 degree pockets on the body, thus assuring exact positioning and alignment and wide distribution of the cutting pressures. Hardened anvils are provided in back of each insert to reinforce the insert and minimize any damage to the cutter body. The inserts are locked rigidly in the body with Super-Jack Wedges and, conse-

USE WALLACE "CUT-MACHINING"! REDUCE YOUR COSTS



"Cut-machining" is two good clean ends—made with one operation. You finish as you cut—any metal—most materials.

**Finishes to
50 R.S.M. or Finer**



FREE BOOKLET DESCRIBES WALLACE NEW PROCESS

Actual cutting photographs, time study results and the complete line of standard Wallace modular units, combination cutters and deburrers, swing saws and mass production units are shown. Write for your copy or tell us also about your problem.

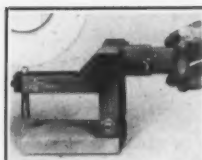


Call BUCKINGHAM 1-7000, Collect Please.

WALLACE SUPPLIES MFG. CO.

1804 W. Cornelia Avenue • Chicago 13, Illinois

For more data circle 589 on Postpaid Card



Low Price—\$124.50
Includes Diamond

NEW 1960 MODEL "SS" RADIUS DRESSER

Newly engineered and redesigned after 19 years of field testing. Convex, concave, or complex combination shapes are dressed quickly and easily by even inexperienced operators. Accuracy to .0002". Dresses all wheels up to 12" diameter.

Write today for free illustrated folder.

SOMERSET TOOL CO. 320 Virginia St.
Hillside, N. J.

For more data circle 590 on Postpaid Card



DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD

Your business letterhead will bring literature.

WATTS BROS. TOOL WORKS

Wilmerding, Pa.

For more data circle 591 on Postpaid Card



WOLVERINE TAPERED END MILLS

FOR SERVICE

finest quality, heat-treated high speed steel—hard and tough!

FOR PRECISION

constant spiral at all degrees of taper; polished hollow ground flutes, double back off; shanks ground to fit standard spring collets and set screw type holders.

FOR ECONOMY

fast, clean cutting without rubbing; minimum heat, longer life; may be resharpened 4 or 5 times at approximately 20% of new tool cost if desired.

Several territories open for distributors.

Write for catalog prices today.



WOLVERINE CUTTER CO.

1066 Butterworth St. • Grand Rapids, Mich.

For more data circle 592 on Postpaid Card

ASTME Tool Show . . .

quently, can be unlocked easily and indexed quickly and accurately on the machine, assuring almost uninterrupted production. They are available in face mill, shell end and half side mill designs in sizes from 4 to 12 inches in diameter; also specials to meet unusual requirements.

For more data circle 177 on Postpaid Card

★ modern machine shop ★

MEASURING INSTRUMENTS

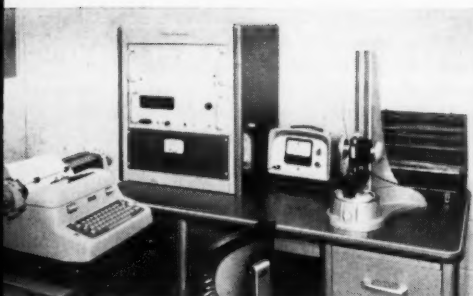
In Booth 634, Cleveland Instrument Co., 6220 East Schaaf Rd., Cleveland 31, Ohio, will present the following instruments.

The automatic typing gage block calibration system greatly increases the speed with which gage blocks can be calibrated to a master set. It also eliminates many possible sources of error and reduces overall calibration costs. The system consists of the Micro-Ac Electronic Gage Block Comparator, a tolerance limit control, the digital display indicator and a coupling and scanner unit connected to an automatic electric typewriter.

The automatic classifying system consists of the basic gaging, amplifier and relay components used in automatic part gaging and sorting equipment. It is intended for use by manufacturers of automatic gaging or machine control equipment or companies who prefer to build their own automation devices.

The Cleveland Roughness Meter is a precision instrument for measuring surface roughness in the shop, the inspection department or laboratory. Accessories for use with this unit will be shown.

The Indi-Ac, Jr. Transistorized Indicator brings the advantages of high precision electronic gages to areas of the shop where electronic gages



Automatic Gage Block Calibration System.

previously could not be considered.

The opposed head Micro-Ac Electronic Microcomparator was specifically designed for ultra precision standards measurements, particularly gage block calibration.

The Micro-Ac Electronic Comparator is designed specifically for ultra precision gaging in the laboratory and

is rugged enough for production use.

The Micro-Ac Ball Comparator is designed to measure small lots of balls rapidly and accurately to a fraction of a millionth inch.

Also on display will be the Indi-Ron Ultra Precision Roundness, Concentricity and Squareness Gage.

For more data circle 178 on Postpaid Card

★ modern machine shop ★

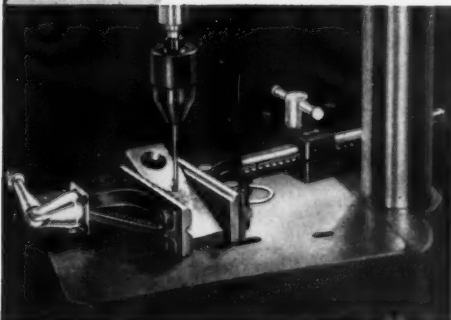
TOOL AND CUTTER GRINDERS

In Booth 1927, Union Twist Drill Co., Athol, Mass., will present its Hartex line of grinders.

The No. 1 Cutter and Reamer Grinder is a versatile machine, particularly suited for grinding primary and secondary clearances on milling cutters, end mills, reamers, metal slitting saws and counterbores. The teeth on cylindrical ground tools may be cleared on the No. 1 Cutter and Reamer Grinder to provide a predetermined

Speed production . . . cut costs with

INSTANT CHANGE



AUTOMATIC KEYLESS CHUCK

Lets you change tools in seconds without stopping the spindle. One chuck does the work of several spindles, won't chew up tool shanks. The greater the torque, the tighter the grip.

DRILL PRESS VISE

Floats and locks instantly, positively, in any position on table. Holds work safely for accurate drilling and tapping. Two models: 9" and 12" capacities.

Write for illustrated folder and name of nearest distributor to AMF Tool Division, American Machine & Foundry Company, 224 Glenwood Ave., Bloomfield, N. J.



WAHLSTROM® / FLOAT-LOCK®
AUTOMATIC CHUCKS SAFETY VISES

For more data circle 593 on Postpaid Card

ASTME Tool Show . . .

cylindrical margin when required.

The No. 2 Formed Cutter Grinder features an indexing method—indexing by fingering from the radial relieved portion of cutter teeth and zeroed in by a dial indicator—which insures uniform chip load per tooth, as well as accurate concentricity of o.d. with hole and it gives a completely sharpened cutter in one fast cycle.

The No. 3 Tangent-Arc Profile Grinder features ease of setup, unobstructed visibility of the working area, convenient fingertip controls and consistent accuracy, which assure maximum production with a minimum of fatigue.

The No. 5 Tangent-Arc Profile Grinder features excellent arrangement of components to assure ease of operation and flexibility of setup for maximum production with a minimum of operator fatigue. This larger capacity radius grinder sharpens cutting tools having radii in the cutting surface and grinds clearances on profile type straight or angular cutters

and end mills. The workholder with work arbor will accommodate cutting tools up to 30 inches in diameter. Also available is a center attachment which permits grinding shank type tools to 13½ inch maximum distance between centers with a maximum diameter of 4½ inches for overall length, but the machine will accommodate 8¾ inch diameter for a 6 inch length of cut. Radius capacity is 7½ inches, concave or convex.

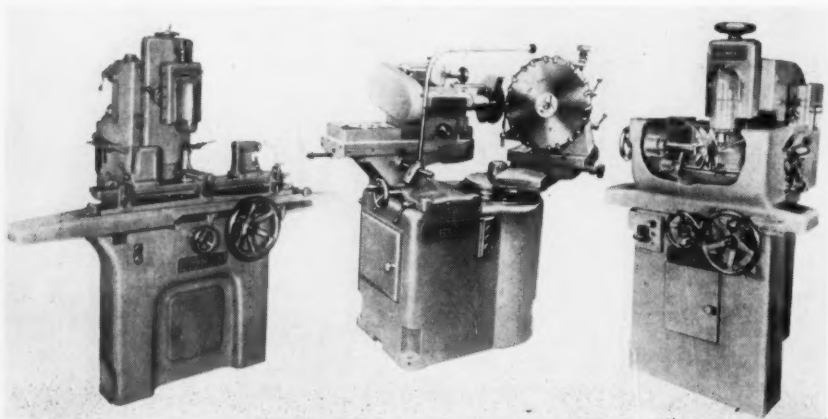
The No. 4 Multi-Point Drill Grinder was designed and developed to grind crankshaft points rapidly and economically. It performs the following basic operations on all drills, No. 50 through ⅝ inch: (1) grind crankshaft points, (2) grind 118 degree point, right or left hand, (3) grind 135 degree point, right or left hand, (4) web thinning and (5) reducing drill lip rake (flattening the face).

For more data circle 179 on Postpaid Card

★ modern machine shop ★

TOOL STEEL

Recent production of the 300,000,000th pound of desegatized tool steel



(Left) The Hartex No. 1 Cutter and Reamer Grinding Machine, (Center) No. 5 Tangent-Arc Profile Grinding Machine and (Right) The Hartex No. 2 Formed Cutter Grinding Machine.

by Latrobe Steel Co., Latrobe, Pa., and examples of the many uses of this type of steel in tools and dies will be among the features displayed in Booth 442.

The Latrobe display will also include a Tool Steel Technical Information Center, staffed by people from the company's metallurgical laboratories. This technical team, headed by Dr. S. G. Fletcher, will offer on-the-spot counsel on tool and die steel grade selection and applications, tool steel heat treating and grinding problems, particularly for automotive industry. For more data circle 180 on Postpaid Card

★ modern machine shop ★

INDICATORS, COMPARATORS AND SCRAPERS

In Booth 1557, Borel and Dunner, Inc., 19313 Farmington Rd., Livonia, Mich., will exhibit the new Interapid Test Indicators, which offer a new concept in design and versatility. Some of the salient features are: a stainless steel body, anti-magnetic; an easier to read tilted dial; automatic shiftless reversing; carbide contact point; greatly reduced contact pressure; and precise repetitive readings. Indicators are available in 0.0005 and 0.001 inch models with 1 and 1½ inch diameter dial sizes. Illustrated is the Model 310-B-1 with 1½ inch diameter; dial in 0.0005 inch divisions.

A versatile instrument for precise measurement of internal grooves from ⅜ to 6 inches will also be shown. It gives accurate three point checking for production or two point checking for single units and short runs. Serrated hinge joints keep tips parallel on wide measurements. The set comes complete with both short and long groove tips, special "flat button" tips, button tips for hole checking, centering arms, spare screws, special socket wrench and screwdriver, all in a sturdy wooden case. All of the tips are chrome plated. The smallest set will enter a

LONGER TOOL LIFE & SMOOTHER FINISHES
WHEN YOU TAP & THREAD WITH

EEZ #215-T

A NON DRYING, NON TOXIC, E.P. LUBRICANT.
PROVE IT WITH A FREE SAMPLE.

LEONARD SMITH, INC.

2915 Independence Rd. Cleveland 13, Ohio

For more data circle 594 on Postpaid Card

Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS

Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 8 sizes, from ⅜" to ¾" U.S.S. Inexpensive — Last for years.



Write for Circular
**NIELSEN TOOL &
DIE COMPANY**
17336 Lahser Road
Near Grand River
Detroit 19, Michigan

For more data circle 595 on Postpaid Card

Another

VICTOR VALUE

TOP QUALITY — LOWEST PRICES

Our Special Import . . .

DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
¼	\$ 6.00	\$ 2.85
½	12.00	5.00
¾	21.00	7.50
1	30.00	10.25
1½	54.00	15.00
2	75.00	20.00
2½	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for \$1.00 each extra.

Order Today—Immediate Shipment from Stock!

VICTOR MACHINERY EXCHANGE, INC.

Dealers in Tool Room Equipment

Dept. 8, 251 Centre St.

New York 13, N. Y. Tel.: CAnal 6-5575

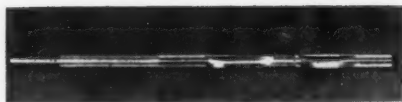
For more data circle 596 on Postpaid Card

ASTME Tool Show . . .

$\frac{1}{4}$ inch hole when retracted. The forged, one piece steel case of the Interapid Model 1D Dial Indicator guarantees long, trouble free service. It is available with a wide selection of contact points, as well as a large choice of back adapters. Features include: zero position is easily adjusted by the knurled cap, it can be locked after adjustment; no moving dial or bezel to become clogged with oil or dirt; no further need for turning the bezel and risking displacement of the indicator.

The Biax Power Scraper, electric and air operated models, can be used for all scraping processes on sliding and locating surfaces. The adjustable stroke of the blade makes it possible to use the Biax for roughing and finish scraping. Outstanding advantages are its unlimited mobility and practical operation. The manufacturer claims better quality of the finished surfaces, 22 and more points per square inch, without conventional figure scraping. Time savings up to 50 percent over hand scraping are claimed with less strain on the operator.

For more data circle 181 on Postpaid Card



This Reducto Tool shrinks oversize holes.

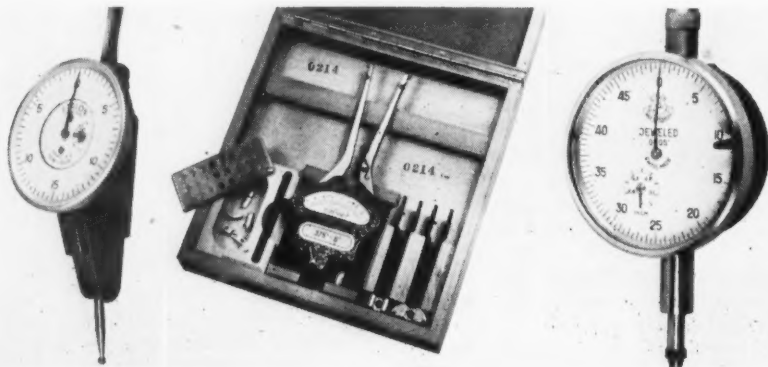
TOOL SHRINKS OVERSIZE HOLES

In Booth 738, Besly-Welles Corp., 120 Dearborn Ave., South Beloit, Ill., will feature its Reducto Tool, which shrinks oversize holes up to 0.005 inch in cast iron and 0.015 inch in more ductile materials. This new tool employs the principle of the Besly X-Press Tap, which cold forms threads in ductile materials.

Basically, the Reducto Tool consists of five sections: (1) a lead-in pilot section; (2) an oversize reamer section, which increases the worn or oversize hole to a calculated amount of oversize; (3) a thread extruding section; (4) a finishing reamer section at a dimension equivalent to the desired hole or bore; and (5) a final piloting section and shank.

As the tool passes through the work, it first reams the hole to a calculated oversize, then reduces the bore and finally resizes by reaming off the crests of the threads formed.

For more data circle 182 on Postpaid Card



(Left) 310-B Test Indicator, (Center) P-2 Comparator and (Right) 1D Indicator.

MICROSCOPES

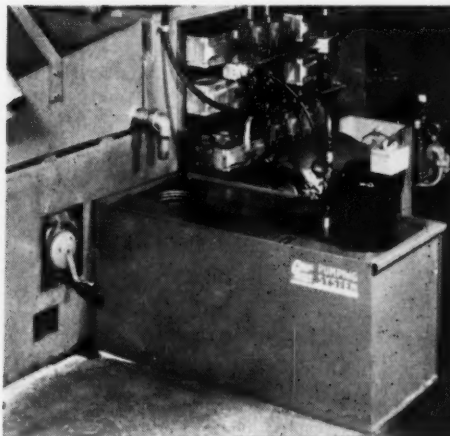
Bausch and Lomb Optical Co., 893 St. Paul St., Rochester 2, N. Y., will feature the entire line of new Stereo-Zoom Microscopes in Booth 630.

Additional new products to be introduced by Bausch and Lomb Optical Company at the Show include a new Scratch Depth Gage, Die-Wear Microscope and Universal Staging Fixture for both the Bench Comparator and

Standard Toolmaker's Microscope. A highlight of the exhibit will be a Stereo-Toolmaker's Measuring Microscope which features the new Power Pod concept and depth measuring attachment.

In addition to new instruments, the B&L exhibit will include the DR-25 Optical Gage, with new features, the bench comparator and a complete line of accessories.

For more data circle 183 on Postpaid Card



ELIMINATE DOWNTIME*

DUE TO COOLANT PUMP FAILURE

GRAYMILLS SUPERFLO COOLANT PUMPING SYSTEMS

*Installed in a matter of minutes, GRAYMILLS Coolant Pump and Tank Units eliminate production downtime by being ready to go when built-in units fail. GRAYMILLS Pumping Systems are easy to clean, can be used with liquids bearing abrasives and will handle any type coolant or cutting oil. Available with centrifugal or gear type pumps, 1/25 to 1/2 HP, in tank capacities of 2 to 128 gals.

Every plant needs one or more reserve GRAYMILLS Pumping Units as insurance against production downtime. Get yours today! They're sold by leading Industrial Distributors everywhere.

Write for Complete Catalog No. 56R



GRAYMILLS CORPORATION

3769 N. LINCOLN AVE. • CHICAGO 13, ILLINOIS

DESIGNED AND PRICED FOR MACHINE BUILDERS USE

For more data circle 597 on Postpaid Card

ASTME Tool Show . . .

INSPECTION INSTRUMENTS

Booth 926 will feature the exhibit of Engis Equipment Co., 431 South Dearborn St., Chicago 5, Illinois.

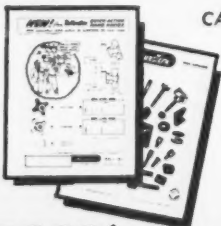
Some of the equipment to be displayed includes: research, analytical and production inspection instruments for roundness, surface finish, straightness, squareness, parallelism and alignment generally—production surface measuring instrument, Talysurf; roundness measuring instrument, Talyrond; photo-electric auto-collimator; auto-collimating theodolite including accessories that will allow projection of the graticule, right angle auto-collimation and optical micrometer; Minnidekkor miniature auto-collimator, small lightweight instrument for use in the workshop or toolroom, eyepiece can be supplied at the end of the telescope or at 90 degrees to the

telescope; Talyvel Level Indicator, an electronic leveling device capable of being read from remote distances up to 300 feet; Talymin Gage Head, an electronic gaging head that can be fitted and used in conjunction with the standard Talysurf components; optical caliper, instrumental process of dividing one complete turn (360 degrees) of any circular scale into any desired number of equal parts; projection equipment for alignment testing; precision levels, including the Autoset Level; high precision length measuring equipment for distances from 6 inches to 30 feet; special angle, circular division and inclination testing equipment including polygons; full range of clinometers; and microscopes for surface inspection.

Part of the exhibit will be displays on education in precise metrology and universal optical tooling.

In Booth 1465, The Hyprez Division of Engis Equipment Company will dis-

!NEW! QUICK-ACTING HAND KNOBS

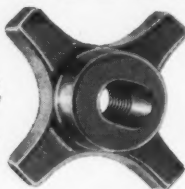


CATALOG INSERT

NEW 16 PAGE
CATALOG

CATALOG
INCLUDES
TRACING
TEMPLATES

FREE! —WRITE TODAY—



ALUMINUM



CAST IRON

JIG AND FIXTURE COMPONENTS

Latch Bolts
Cast Iron Hand Knobs
Aluminum Hand Knobs
Quarter Turn Screws
Shoulder Screws

Jig Feet (3 Types)
Spherical Washers
Fixture Keys
Knurled Head Screws
Toggle Shoe Clamps & V-Pads

HOLD DOWN AND CLAMPING TOOLS

T-Nut & Stud Sets
Step Block & Clamp Sets
Flanged Nuts
Cut Thread Studs

Tee Nuts
Coupling Nuts
Adjustable Step Blocks
Strap Clamps (Plain & Step Type)



Northwestern

119 HOLLIER AVE.,

DAYTON 3, OHIO



For more data circle 598 on Postpaid Card

play the Engis Tilt Swivel Vise, Engis Motor Model E for the Di-Profiler Reciprocating Hand Machine, a new Di-Profiler Standard Set No. 1, Hyprez Diamond Compounds and accessories and the Hyprez Oscillating Tool Finishing Machine.

For more data circle 184 on Postpaid Card

★ modern machine shop ★

GEAR CUTTING EQUIPMENT

In Booth 544, Fellows Gear Shaper Co., 78 River St., Springfield, Vt., will show gear cutting tools and gear measuring instruments.

A 12M Involute Measuring Instrument, equipped with a new high speed recorder, will be demonstrated. The recorder can be set to magnify gear errors up to 1,000 times actual size.

A No. 4 Fine Pitch Red Liner, with 1,600 to 1 magnifications, will show a composite check of precision master gears.

A new type of gear inspection instrument will be shown for the first time, in addition to some small, hand operated gear checking equipment.

For more data circle 185 on Postpaid Card

★ modern machine shop ★

CUTTING TOOLS

In Booth 1644, Metal Cutting Tools, Inc., Rockford, Ill., will display several new and improved products.

With the new special Metcut End Cutting Tools, there is less chatter, better finish and longer tool life provided by the "Taper Torque Drive" design that gives greater strength and rigidity and maintains accurate alignment. The company's back spotfacers slash machining costs because of several improvements, including back-taper that cuts friction and o.d. wear, positive rake angle that assures better cutting action and less chatter, multiple flutes and ground radial relief. The Metcut "Pin Mount" Core Drill now

END AIR LINE MOISTURE PROBLEMS

get the **CLEANEST,
DRIEST**
compressed
air!

SEND FOR
CATALOG

Contains complete details,
all essential
ordering information. Send
for your copy
today!



**NO MOVING PARTS . . .
NO FILTERS TO REPLACE!**

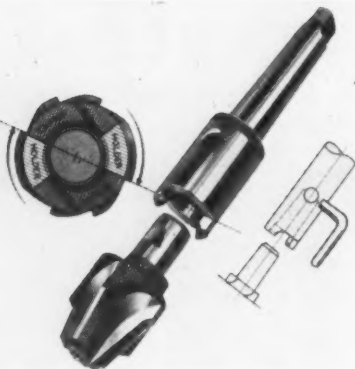
No more air line freezups with the CMD Textite Separator. *No* moving parts, *no* filters make Textite virtually maintenance-free. Use this proven separator to prevent rust, washing out of lubricants, worn gaskets, scored cylinder walls, clogged nozzles and costly equipment repair. Especially effective for keeping paint and finishing lines dirt and moisture-free.

**CHICAGO MANUFACTURING
& DISTRIBUTING CO.**

1910 W. 46th St. • Chicago 9, Ill.
For more data circle 599 on Postpaid Card

MODERN MACHINE SHOP 311

ASTME Tool Show . . .



View of the Melcut End Cutting Tool.

features these improvements—cutters are standard with M-30 steel, holders are high speed steel and the hold in

the screw is recessed. Pin Mount Oil Hole Core Drills are an adaptation of the regular Pin Mount. The company claims that they offer tremendous price savings.

For more data circle 186 on Postpaid Card

★ modern machine shop ★

TURRET DRILLS AND TOOLHOLDERS

In Booth 734, Burgmaster Corp., 15001 South Figueroa St., Box 311, Gardena, Calif., will display its line of Tool-flex Holders and the Model "O" Six Spindle Auto Indexing Turret Drilling and Tapping Machine.

Tool-flex Full Floating Toolholders automatically compensate for parallel and angular machine spindle misalignment. Their features include: self-centering; cut setup costs; eliminate bell mousing, chattering and oversized holes; adaptable to all single and multiple spindle machines; for tap-

THE LIGHT THAT SUCCEEDS

UL LISTED

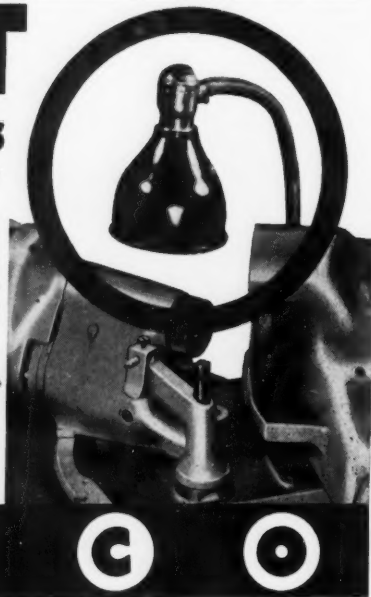
Vimcolights make all operations more successful. No eyestrain, no rejects with on-the-spot lighting. Vimcolights are rugged, yet flexible . . . move into position easily, without resetting, and hold their position even under severe machine vibration.

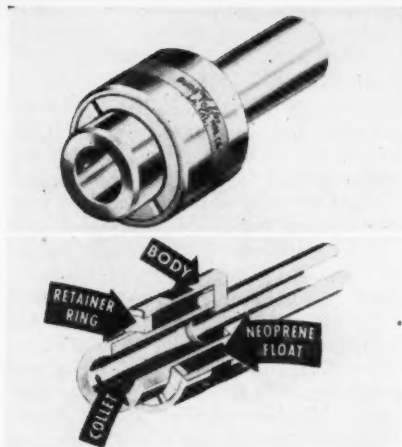
IN THE BEST COMPANY

Pictured is the Black & Decker No. 282 Super-Service Valve Refacer, with Vimco light.

VIMCO MFG. CO. INC. • Holland, N. Y.

Circle 600 on postpaid card for more information about economical, on-the-job lighting.





Burgmaster Tool-flex Floating Toolholder.

ping, reaming, counterboring, die head floating and spotfacing; simple construction—only four parts.

The Bench Model Burgmaster is precisely made and exactly designed for the specialized production of small holes and related machining operations. It is small, compact, requires a fraction of usual bench space and it is said to outmode conventional procedures for drilling multiple holes. The practice of moving the fixture from spindle to spindle and realigning the work to the tool is costly in both time and production. The Burgmaster eliminates this waste. By bringing the spindle to the work, rather than moving the work to the spindle, extreme reductions in production costs are effected.

For more data circle 187 on Postpaid Card

★ modern machine shop ★

MILLING MACHINES

In Booth 1909, U. S. Burke Machine Tool Division, 3 Brotherton Road, Cincinnati 27, Ohio, will have on display three of its milling machines.

The Quartet Milling Machine is a

April, 1960



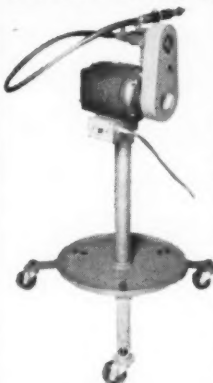
FLEXIBLE SHAFT EQUIPMENT . . .

**Leaders in the field for over
40 years**

FASTER . . .

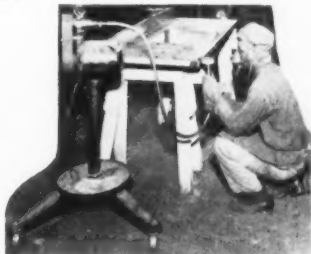
haskins

equipment will speed production on any metal working job with its range of speeds and constant power. Selection of speeds up to 18,000 RPM — 1/4 to 2 horsepower.



JOB-READY . . .

haskins portable flexible shaft equipment is ready to go to work no matter where your job may be. You should know more about *haskins* flexible shaft equipment and accessories. Let us recommend the equipment best suited for your shop.

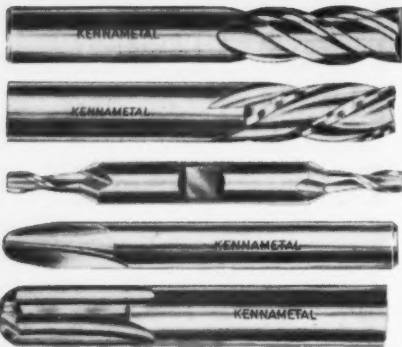


R. G. HASKINS CO.

2649 W. HARRISON ST.
CHICAGO 12, ILLINOIS

For more data circle 601 on Postpaid Card

MODERN MACHINE SHOP 313



NOW... A COMPLETE LINE OF SOLID KENNAMETAL® END MILLS

stocked for immediate delivery

Now, Kennametal Inc. offers you a complete line of solid, precision-ground end mills of the same consistently high quality tungsten carbide used for years in other types of Kennametal cutting edges for the metalworking industry.

For every job requirement. Stocked in fifteen different styles, new Kennametal End Mills are available in diameters from $\frac{1}{16}$ " to $\frac{3}{4}$ " . . . a size and style to match your milling requirements.

For better finish. Kennametal has an extremely high YME . . . up to 94 million psi . . . three times that of hardest steel. High hardness, plus one-piece construction, provides maximum rigidity for smooth, even finish to meet high precision requirements.

For longer life. Kennametal End Mills are all-carbide . . . eliminate brazing failure, and provide maximum resistance to heat and abrasion.

New 12-page Catalog now available. Ask your Kennametal Representative or write Kennametal Inc., Latrobe, Pa.

®TRADEMARK

97233



INDUSTRY AND
KENNAMETAL
...Partners in Progress

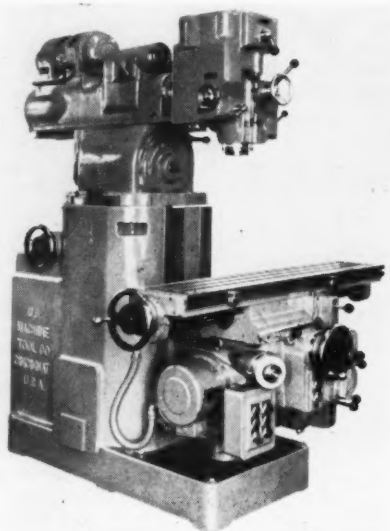
For more data circle 602 on Postpaid Card

314 MODERN MACHINE SHOP

ASTME Tool Show . . .

combination horizontal and vertical miller built on the same base. Without removing the workpiece from the table, horizontal, vertical, angular and universal milling operations can be performed. At the Show, a Quartet with new, heavy duty 3 h.p. vertical head will be exhibited. The machine has an independent 5 h.p. horizontal spindle drive motor mounted in the base, with a $\frac{3}{4}$ h.p. motor to feed the table and saddle. The heavy duty vertical head has 6 inches of powered quill feed and a variable spindle speed range to 4,200 revolutions per minute.

Two models of the Millrite Vertical Milling Machine will be exhibited for the first time. It is a full size dovetail ram and turret vertical miller. The Millrite has several unique features, including "feather feed" to the quill, a system which utilizes a lead screw and nut to lower and retract the spin-



Quartet Miller with 3 h.p. vertical head.

April, 1960

dle. Also, it has an anti-friction bearing drawbar, internal quill lock, positive spindle lock and spindle brake as standard equipment. The machine has a 7 by 27 inch table, 4 inch quill feed and ram movement of 12½ inches. It is powered by a ¾ h.p. motor through high capacity vee belt drive.

Duplex Half Mills are built on the building block principle. They can be obtained with No. 40 taper heavy duty spindle heads, a 10 by 48 inch table mounted on a box type slide, 18 inch stroke air-hydraulic longitudinal table feed and independent vertical spindle adjustment. The Half Mill line permits mounting various standard milling assemblies, required for specific milling jobs, on a common steel plate, positioned for maximum efficiency. This allows the user to purchase the equivalent of high production special machine tools at a nominal price.

For more data circle 188 on Postpaid Card

★ modern machine shop ★

LOW TEMPERATURE EQUIPMENT

Cincinnati Sub Zero Products, 3930-S Reading Rd., Cincinnati 29, Ohio, will demonstrate its ability to supply equipment versatile in both design and use. Multipurpose Model A-120-5 was engineered especially for the Show and will be on display in Booth 409.

This new model is equally adaptable to metallurgical applications for special test requirements. For production chilling, a convection fluid can be used in the chamber to facilitate chilling of small parts. When special tests are necessary, an air circulator in the lid provides mechanical air convection to minimize temperature variation and maintain close temperature control. Operating range is provided from 70 to minus 130 degrees F. Exterior dimensions are 40 inches long by 32 wide by 44 high. Chamber dimensions are 30 inches long by 18 wide by 16 deep. The unit is of all steel unitized con-

COOLIE-TOOLIE

THE PRACTICAL,
DEPENDABLE,
QUALITY, VAPOR
**COOLANT
SYSTEM!**



**For Continuous High Production
and Longer Tool Life**

Here is the compact, popular Coolie Toolie Vapor Generator that in just a few short years has made flood cooling old-fashioned. By a unique application of evaporative cooling and heat of vaporization the Coolie Toolie unites the combined heat absorption properties of compressed air at the precise moment of expansion, with water and coolant concentrate at the point of vaporization, to provide the most efficient method yet known to remove heat from cutting and grinding surfaces.

There's no reason to spend thousands of dollars on new equipment when, with a Coolie Toolie Vapor Generator, you can make your present equipment more efficient by increasing speeds and feeds.

FOR INCREASED TOOL LIFE—
INCREASED PRODUCTION—EASY
INSTALLATION AND OPERATION
—AND LOW COST . . . ORDER
YOUR COOLIE TOOLIE VAPOR
GENERATOR TODAY.

\$49 40

Includes 1 can Coolie
Coolant Concentrate
(makes 1 gallon coolant)
Write for free brochure.

atsco

Associated Technical Sales Co.
3629 N. Dixie Drive, Dayton, Ohio

For more data circle 603 on Postpaid Card

MODERN MACHINE SHOP 315

ASTME Tool Show . . .

struction with an exterior finish of grey lacquer. Completely portable, the Multipurpose Model A-120-5 is mounted on four swivel casters. Operation is for 230-60-1 electric service.

A cascade refrigeration system pro-

BURR KEYSEATERS

Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erecting, and repair work.

ALSO Planer-type MILLER up to 144" table length.

Write for Bulletins and prices.

185 25th St.
John T. Burr & Son, Inc. Brooklyn 32, N. Y.



For more data circle 604 on Postpaid Card

3 H.P. Heavy Duty Wide Arm Grinder. \$362.30

1-H.P. Heavy Duty Wide Arm Grinder and Buffers. \$177.65

Write for Circular

W & F MACHINE WORKS, INC. • Norfolk, Nebr.



For more data circle 605 on Postpaid Card

ALEXANDER deep throat engraver

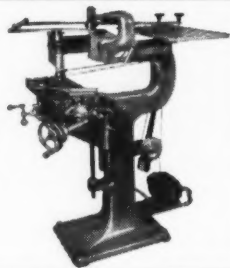
does . . .

Precise, two-dimensional work. It handles workpieces up to 10" high, 38" wide on a worktable 20 x 8"; optional auxiliary table 18 x 24". Ratios 1:1 to 1:50. Spindle has fine and coarse feed adjustments. Cutters up to 1/4" dia. Speeds—2800 to 15,000 rpm. 1/4-hp. motor.

Write for Catalog C

J. ARTHUR DEAKIN, INC.

31 Roseland Ave., Caldwell, N. J.



For more data circle 606 on Postpaid Card



Cincinnati Multipurpose Model A-120-5.

vides maximum operating efficiency at nominal cost. It meets any plant requirements and can be disconnected from service for use in various plant areas without loss of refrigerant.

A wide range of applications is possible with the accessory features which include an 8 by 16 inch window, interior illumination, indicating-recording controller and air circulator. The lid is full-opening and counterbalanced. Heaters can be adapted to this model, if required, for high temperature tests.

For more data circle 189 on Postpaid Card

BROACHES AND TOOL BITS

The duMont Corp., Greenfield, Mass., will display a complete line of standard stock round broaches in Booth 647. Used in an arbor or hydraulic press, these push type Minute Man Broaches finish to exact size in one pass.

A demonstration will be given of making square holes from round holes. This is a simple, fast and routine operation with Minute Man Square Broaches. High speed steel broaches for the quantity production of keyways will be on display. These broaches may be used with hydraulic or hand operated arbor presses. The back of the broach is ground to fit the radius of the bore in which it will cut and the body of the broach thereby supports itself in the hole, requiring no guide or bushing. With the Minute Man Keyway Broach, a keyway can be cut by hand to the exact dimensions desired in less than sixty seconds. Sets of these broaches come in a compact tool kit and contain everything needed to do the job.

The three major factors in tool bit performance—toughness, wear resistance and heat resistance—are precisely balanced in the fine grain steel used in duMont Tool Bits.

They are available square ground in sizes from 3/16 inch square by 2 1/2 inches long to 1 inch square by 7 inches long, and rectangular ground in sizes from 1/4 by 3/8 by 3 inches long to 3/4 by 1 1/2 by 7 inches long.

For more data circle 190 on Postpaid Card



(Left) Square Broach, (Center) Standard Push Type Keyway Broach, (Right) Tool Bit.

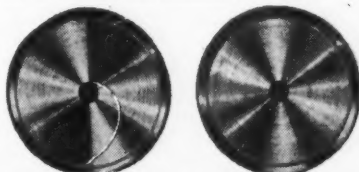
April, 1960

Troubled by Withdrawal Marks?

**the new RELIEVOMATIC*
saves you costly refinishing!**

No more rejects or refinishing because of marred surfaces made by cutting tools on their return pass! Now—the RELIEVOMATIC renders precise parts with perfectly smooth surfaces. For boring, turning or facing on automatic metal turning equipment.

Write for complete technical literature.



normal marred surface

* U. S. Patent No. 2,712,767

perfectly clear surface
with RELIEVOMATIC!

SILBER PRODUCTS, INC.

870 ESSEX STREET • BROOKLYN 8, N. Y.

Nightingale 9-8600

For more data circle 607 on Postpaid Card

**Serving Industry
for 57 Years with**

HI-DUTY HIGH-SPEED TWIST DRILLS

COMPLETE RANGE of SIZES and STYLES

• Flat Twisted Drills • Rolled
Section Drills • Milled Type Drills
Special Drills • Step Drills
Polished Flutes

*Only HI-DUTY makes FLAT TWISTED DRILLS! . . . 1/2" and larger. For large diameter and deep hole drilling, they can't be matched!

FAST DELIVERY! Contact your Industrial Supplier or write today for Catalog and Price List. Inquiries from representatives and distributors invited.

**HI-DUTY
DRILL WORKS**

Division of Hi-Duty Industries, Inc.
FLEETWOOD, PA.

For more data circle 608 on Postpaid Card

MODERN MACHINE SHOP 317

ASTME Tool Show . . .

SPINDLES

In Booth 1430, Standard Electrical Tool Co., 2487 River Rd., Cincinnati 4, Ohio, will demonstrate the "endless versatile variations" of its building block equipment.

"Tooling for Productivity" is made easy with the line of Super Precision

Attention

MOLD MAKERS

New handy jig for cutting ejector pins to length. Handles all diameters from $\frac{3}{32}$ to $\frac{3}{4}$ —any length. Faster by far than makeshift set-ups.

Monarch Ejector Jig—Developed by mold-makers for moldmakers. Only \$15.95.

MONARCH MOLD and ENG. CORP.

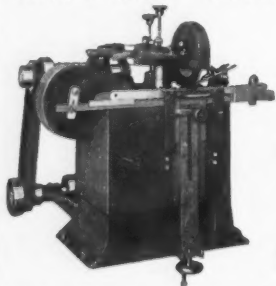
2321 N. 28TH ST. • MILWAUKEE 10, WIS.

For more data circle 609 on Postpaid Card

PAYS FOR ITSELF

With Profits from Resharpening
1 Gross of Hack Saw Blades.

**SHARPENS • RECLAIMS
AUTOMATICALLY
HACK • BAND • CIRCULAR SAWS**



Write
For
NEW
1960
Catalog
Today

Model EC
Combination
Bench Type

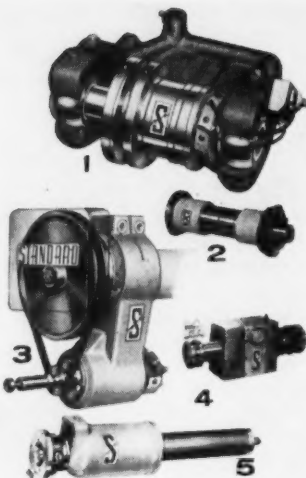
WARDWELL

Manufacturing Co.

3803 Ridge Road • Cleveland 9, Ohio

For more data circle 610 on Postpaid Card

318 MODERN MACHINE SHOP



Spindles for electrolytic metal removal.

Spindles, assembled with a complete range of attachments, consisting of single or compound feeds, swivels, one or two axis tables, wheel guards, belt guards, balancing type wheel holders, work spindles and so on.

Super Precision Spindles, motorized or independent drive, piggy back design, serve either as a work head or of individual design for grinding, milling, drilling and boring.

The company has expanded its program on spindles for electrolytic metal removal. Certain commercial industries are now electrolytically machining the new metals and, also, converting existing machine tools for machining such products as end mills, milling cutters, carbide drills, dental drills and so on. The accompanying illustration is intended to identify available conversion equipment on basic machines: (1) mounting bracket as removed from an older model Brown and Sharp O. D. Grinder, assembled with a Super Precision Spindle and Slip Ring for 300 amp. power supply; (2) Super Precision Spindle with slip ring for 150

April, 1960

amp. power supply instantly interchangeable for existing spindle on a Cincinnati No. 2 Tool and Cutter Grinder; (3) 50 amp. high speed (25,000 r.p.m.) grinding attachment with interchangeable quills for instant assembly on the spindle nose housing of a conventional surface grinder; (4) assembly intended for No. 08 Milling Machine with mounting bracket and integral Super Precision Spindle with 600 amp. slip ring and built-in 1 inch travel through handwheel, including positioning locks; (5) 300 amp. motorized spindle for instant installation on any surface grinder.

Suitable spindles with or without movements, such as 360 degree swivel, single or compound feeds, interchangeable wheel holders for straight and cup wheels, sprinkler-spider for adequate electrolyte supply, are available for all types of machine tools ranging from lathes, planers, boring mills, Blanchard or Heald type of rotary surface grinders, vertical chucking grinders, all types of milling machines and so on.

For more data circle 191 on Postpaid Card

★ modern machine shop ★

SPEED LATHES

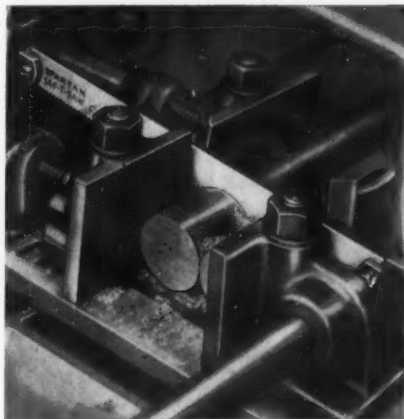
Schauer Mfg. Corp., 4501 Alpine Ave., Cincinnati 42, Ohio, will exhibit in Booth 838 a variety of speed lathe models which are representative of its entire line.

Among the advanced speed lathe designs are those which are operated by standard automation controls. These are heavy duty speed lathes, designed for 24 hour operation which feature timed operation sequences where time off, time on, opening or closing of the workholding fixture and selection of spindle speeds can be controlled in proper sequence, either automatically or manually. Schauer will also exhibit two speed, 1 h.p.

April, 1960

**It will pay you to
standardize on**

Saf-T-Saws



A three-piece welded edge power blade, flexible; will take extra tension and is shatter proof.

Our SPARTANIZED heat-treating gives a uniform hardness a bit different than others.

Hundreds of plants are getting results that SATISFY. Give them a trial today.

**There's a SPARTAN
Distributor near you**

Write for Hacksaw Bulletin S-T

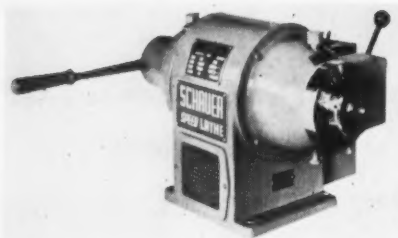
Spartan

**SAW WORKS, INC.
SPRINGFIELD, MASS.**

For more data circle 611 on Postpaid Card

MODERN MACHINE SHOP 319

ASTME Tool Show . . .



Speed Lathes are featured in Booth 838.

speed lathes for either bench or pedestal mounting, which can be equipped with collets, expanding mandrels, air chucks, vacuum chucks, magnetic chucks and other types of holding fixtures for parts of irregular contour. These speed lathes are powered with

fan-cooled motors, which provide for an unusually high number of starts and stops per hour without overheating. Newly designed brakes enable split-second spindle stops, even when the machine is equipped with heavy holding fixtures. Where air operated holding devices are used, these speed lathes are equipped with built-in double acting air cylinders of 1,500 pounds drawbar capacity. The air cylinder is controlled by low voltage solenoid valves, that are mounted on the speed lathe without using external hose connections.

For more data circle 192 on Postpaid Card

★ modern machine shop ★

DUST CONTROL EQUIPMENT

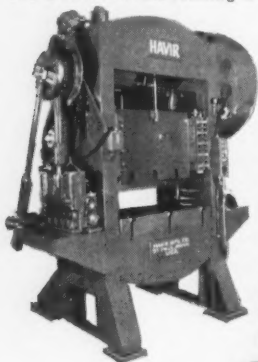
In Booth 736, Torit Mfg. Co., Dept. 703, 1133 Rankin St., St. Paul 16,

Hi-Production Stamping . . . or Versatility



type rams that add one third and more to die life by providing maximum ram support from every angle.

See a HAVIR Press running a production job at the A.S.T.E. Exposition, Booth 531.



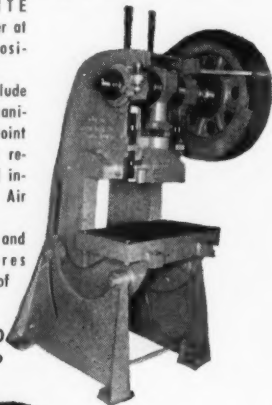
Precision and rigidity prolong the life of carbide, progressive and all dies.

HAVIR Presses available in 5 to 200 Ton. PRESS-RITE O.B.I. Presses in 2 to 85 Ton.

PRESS-RITE O.B.I. Presses with high tensile semi-steel cast frames have exceptional rigidity permitting generous die area that lets you run bulky jobs on lower tonnage presses.

See PRESS-RITE Presses under power at the A.S.T.E. Exposition, Booth 531.

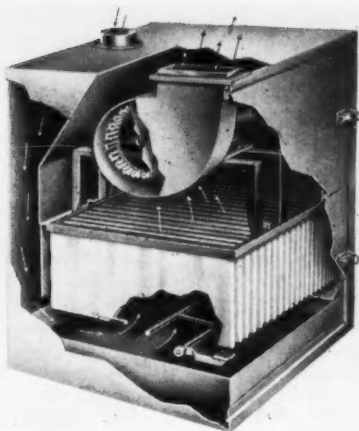
Other features include PRESS-RITE mechanical clutch with 4 point engagement and replaceable hardened inserts or Air-Flex Air Friction Clutch. Choice of standard and optional features makes selection of right press easy.



Sales Service Mfg. Co.

2361 University Ave. • St. Paul 14A, Minn.

For more data circle 612 on Postpaid Card



Schematic of Torit Cabinet Collector.

Minnesota, will show its extensive line of dust control equipment. High dust removal efficiency characterizes the

versatile cabinet cloth filter type dust collectors. In these models, available in a wide range of sizes, specially woven cotton cloth filters are said to remove more than 99 percent of the dust in typical grinding or machining operations. The compact, self-contained units are designed for use with sanders, grinders, metal saws or in any applications where gritty dust must be removed. Filtering efficiency is said to be so high that this type of collector has been successfully used in removing smoke in welding department operations.

Diamond collectors are designed for installation in either a central collecting system or with unit type systems and they are adaptable to any type of diamond wheel grinding. The diamond collector operates on a centrifugal separating principle that eliminates filters entirely and permits a compact, low price design. The unit deposits the diamond-bearing dust in a clear Plexi-

ELECTRA

HEAT TREATING FURNACES

DEPENDABLE, ECONOMICAL

H and D Series . . . Hardening and Drawing Combination

Hardening range 2000° F. and 2300° F.

Drawing range 800° F. and 1250° F.

Four standard models . . . or special design to suit

Complete with automatic indicating controllers, and ready to operate on standard line voltages . . . single or three phase.

ELECTRA'S superior features include:

- Welded cabinet construction steel casing
- 7" firebrick and backup insulation throughout
- Arch roof design
- Air operated vertical door
- Silicon carbide Hearth Plate
- Low watt density, heavy gauge heating elements

Write for bulletin B-59 . . . or call

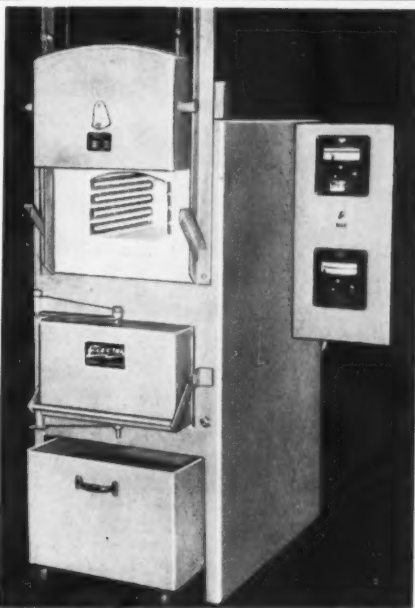
ELECTRA PRODUCTS COMPANY

Montgomeryville, Pa.

Ulysses 5-6674

Territories Open For Representatives

For more data circle 613 on Postpaid Card



ASTME Tool Show . . .

glas container, where it can be visually inspected. When full, the top can be unscrewed and the container easily emptied. No other maintenance is necessary. Collector, plus power unit, weighs only 65 pounds, allowing it to be mounted directly on machinery, on walls, overhead beams or on a specially designed table.

Efficient cyclone separator type dust collectors were designed especially for use with buffing wheels or where large volumes of dust must be handled. Cyclone separators are especially effective in buffing and polishing operations, for they precipitate dust centrifugally and have no filters to clog. A single separator may be used to serve a number of machines whose frequency or dust volume would not warrant installation of individual collectors. The cyclone separator operates

by drawing dust into the top of the separator's cone, where spiral baffles direct the air into a whirlwind action. Dust particles are precipitated out of the air stream by centrifugal action and settle to the dust reservoir below. With as much as 95 percent of the dust removed from the air in this way, the cleaned air can be discharged outside, if practical, or through after-filters, if heat conservation is a requirement. Torit units handle from 260 to 6,500 c.f.p.m. with two or more units often coupled together when greater capacities are required.

For more data circle 193 on Postpaid Card

★ modern machine shop ★

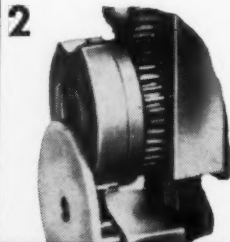
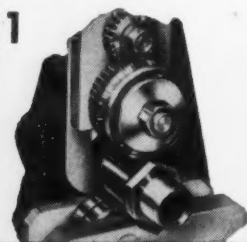
BEARINGS, RECESSING TOOLS, CHUCKS, STUD SETTERS, CONTROL SYSTEMS

In Booth 1127, Scully-Jones and Co., 1909 South Rockwell St., Chicago

Difficult- to-mark parts?

1. Rounds or Hexes—Solids or Tubes
2. Close-Tolerance Marking
3. Parts with no true radius
4. Conical Pieces

Write for Bulletin.



a G-R-D Fixture will do your job

M. E. CUNNINGHAM CO.

1051 CHATEAU ST.
PITTSBURGH 33, PA.

For more data circle 614 on Postpaid Card

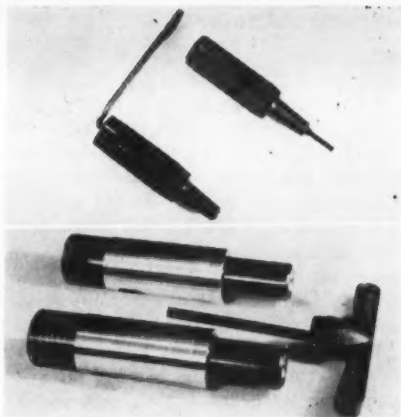
8, Illinois, will demonstrate numerous tools.

Recirculating anti-friction Tycho-way Bearings and Super-Cision Ball Screws are natural companions for supporting machine components moving in a straight line, and for positioning them with a minimum of mechanical force. Used together, they help make linear motions completely predictable, accurate and repeatable.

Automatic recessing tools have the new simplified adjusting collar with interchangeable stop collars and pilot nose assemblies to quickly adapt one tool to pilot either in a fixture bushing or the work.

"Better-Hold" Chucks apply powerful and accurate centering fit when simple lock-and-eject nut draws tapered liner into compression in mating taper on i.d. of chuck.

"Stub-A-Long" Chucks permit accurate drilling without guide bushings.

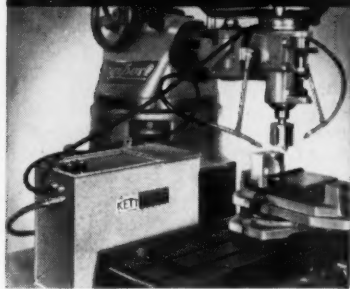


(Above) "Safe-Torque" Hand Operated Screwdriver, (Below) Hydraulic Mandrel.

Drill collet grips drill shank or margins with powerful action, for rigidity and accuracy, when lock-and-eject nut draws tapered collet into chuck body.

WHATEVER YOUR DRY MACHINING PROCESS—

Economical KETT "Mystic-Lube" Mist Coolant Generator



GIVES YOU...

- Faster Operating Speeds
- Longer Tool Life
- Deeper Cuts
- Better Finishes
- Lower Costs
- Flexibility
- Portability
- Dependability

Mist dissipates in the air—cools by refrigeration principle. No special coolants, no moving parts—operates off any air line. Compact, all-in-one unit, one and four gallon size, has features non-available in many higher priced models. Quality designed for quick transfer, ease of maintenance.

KETT

WRITE FOR LITERATURE AND PRICE LIST
THE KETT TOOL COMPANY

5048 Madison Rd. Cincinnati 27, Ohio

For more data circle 615 on Postpaid Card

ASTME Tool Show . . .

"Toolitrol" System is a tool control method that eliminates time consuming tool adjustments in multiple spindle machines and obsoletes the cut-and-try method. It coordinates at-the-machine problems of presetting, storing and changing tools; helps reduce setup time, down time and inspection time so that machines operate at or near capacity.

Hydraulic expanding chucking tools hold parts and tools during turning, grinding and inspection operations. When actuating screw is turned in, the fluid is put under high pressure which expands or compresses the chucking surface and creates an extremely rigid and accurate shrink fit between tool and part being held.

Self-opening stud setters have interchangeable shanks which quickly

adapt them for air or electric power tools, drill presses, radial drills and similar machines. Modular design permits quick, easy changeover of jaws and stop collars for setting threaded studs. Drivers are self-actuating.

"Safe-Torque" Tools use a precise and dependable overload clutch, which operates on a new principle of over-running roller drive, releasing instantly and completely when resistance to the driving torque reaches the preset limit. The roller drive principle is completely independent of sliding friction for the transmission of torque, since all contacting and driving members roll on each other.

For more data circle 194 on Postpaid Card

★ modern machine shop ★

LATEST TECHNIQUES IN HARDNESS TESTING

Practical techniques, featuring the latest advances in the science of hardness testing for quality control and the determination of the hardness of materials, metals and their alloys will be demonstrated in Booth 715 by American Chain and Cable Co., Inc., Wilson Mechanical Instrument Division, 931 Connecticut Avenue, Bridgeport 2, Connecticut.

Wilson will introduce to the tool and mechanical engineer its completely new and highly efficient Model LL Microhardness Tester. The economical and semi-automatic Model LL, with its relatively selective range of indentation loads of 25 to 1,000 grams, has the ability to check work specimens with ease and reliability. In planning for increased productivity and profits through careful tooling and instrumentation for production control, American industry should welcome this rugged instrument and, thereby, facilitate the testing of cutting tool carbide tips, watch springs, surgical needles, drill rods, plated surfaces and so on.

Mahr

50 Millionths Reading

SELF-CENTERING

BORE GAGES

Check bores for size, out-of-round and taper in any spot and to any depth within range of instrument to an absolutely reliable accuracy of

50 MILLIONTHS
of an inch

THIS HIGH PRECISION INSTRUMENT IS AN INEXPENSIVE, ACCURATE AND DEPENDABLE INTERNAL COMPARATOR

Small Bore Gages

RANGE .040" TO .140"	PRICE \$124.00
Complete in Hardwood Case	
RANGE .140" TO .280"	PRICE \$110.00
Complete in Hardwood Case	
OTHER SIZES UP TO 10"	

GUARANTEED Mahr QUALITY

IF NOT AVAILABLE AT YOUR FAVORITE SUPPLY HOUSE — WRITE TO US FOR ILLUSTRATED FOLDER.

MAHR GAGE CO., INC.
274-MO LAFAYETTE ST. • NEW YORK 12, N.Y.



FINE ADJUSTMENT

ADJUSTABLE LIMIT HANDS

MEASURING HEADS ARE HARDCHROME PLATED FOR MAXIMUM WEAR

HEADQUARTERS FOR PRECISION MEASURING INSTRUMENTS AND FINE TOOLS

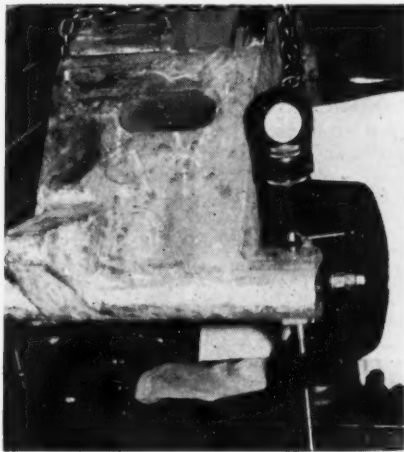
For more data circle 616 on Postpaid Card

324 MODERN MACHINE SHOP

April, 1960

Of interest to the discerning tool engineer, as it is being shown for the first time, will be a compact Rockwell Hardness Tester which has been designed for application and use on the testing of large components and work specimens that are too heavy for economical hauling to a testing station. Utilizing C-clamp brackets with varying throat sizes, this easy-to-handle and efficient instrument can be moved from one location to another in open yards, production areas or construction sites. The brackets are manufactured from lightweight alloy steels to give a rigid clamping effect. Standard Rockwell B and C scale tests are produced by spring loading. These springs are naturally and artificially aged.

To round out the exhibit, the versatile TwinTester, a combination unit which is capable of making readings in both the Rockwell and Rockwell Superficial ranges; the Size 3 fully automatic feed and discharge Rockwell Tester, a unit for mass production hardness evaluation of up to 1,000 tests per hour; the motorized and semi-automatic Model Y Tester; several



Hardness Tester applied to heavy casting.

April, 1960

4 Reasons why you should use

GAMMONS DIE REAMERS



Specially treated for today's modern die steels.



Rapid cutting capacity.



Tapers per inch .005, —.008, —.013 in stock.



Large range of standard sizes in stock at all times for your convenience.

WRITE FOR
COMPLETE INFORMATION

GAMMONS • HOAGLUND CO.

MANCHESTER 2,

CONN.

Manufacturers of helical taper pins, chucking,
die makers and special reamers

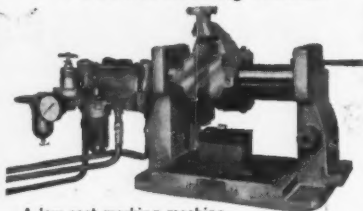
For more data circle 617 on Postpaid Card

MODERN MACHINE SHOP 325

SHORTCUTS to MARKING

by the Low Cost "point of contact" method that reduces waste.

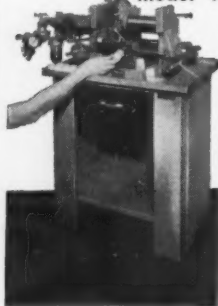
Model 9 Pneumatic Marking Machine



A low cost marking machine powered by your regular air line 75 psi. and over. It marks parts, tools, sleeves, etc. of steel and also marks plastic with slight additional assembly. Write for Catalog No. 9.

PERIPHERAL MARKING MACHINE

Model 9AH



Marks precision calibrations and graduations around dials. Uses flat dies to mark rounds and roll dies to mark flats. A high production machine that will not break even brittle plastic parts. Write for Catalog No. 9AH.

Ask ACROMARK ENGINEERS which machines suit your marking need.

ACROMARK
Company

9 Morrell St., Elizabeth, N. J.

"The Original Marking Specialists"

For more data circle 618 on Postpaid Card

326 MODERN MACHINE SHOP

ASTME Tool Show . . .

hand operated Rockwell Testers; the Rockwell Superficial Tester and the Tukon Microhardness Tester, as well as a wide variety of accessories, will be demonstrated. Thus, the Wilson booth will serve as headquarters for the solving of everyday and complex hardness testing problems.

For more data circle 195 on Postpaid Card

★ modern machine shop ★

GRINDING MACHINES

In Booth 1816, Micromatic Hone Corp., 8100 Schoolcraft Ave., Detroit 38, Mich., will show its line of grinding machines. Although this equipment is not new, it has only been shown once before in the United States at the company's in-plant show last November.

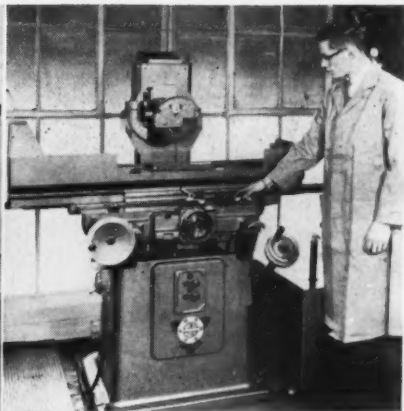
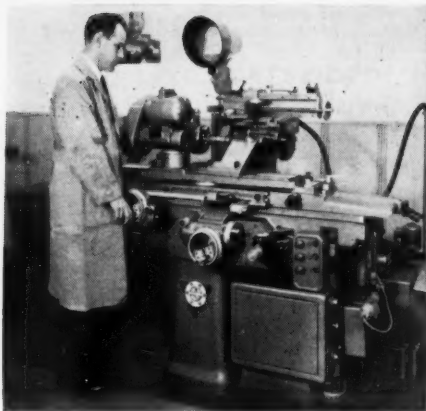
The Model 540 Hydraulic Surface Grinder—6 by 18 inch capacity—provides simplicity of design combined with both accurate and efficient performance.

The Model 1400 Hydraulic Surface Grinder—8 by 24 inch capacity—has all of the features of the smaller Model 540, but it is of larger capacity and includes many additional features. It is a high quality machine that is most suitable for form grinding and other toolroom uses.

The Model 1215 High Precision Circular Form Tool Grinder meets the demand for a cylindrical grinding machine capable of producing cylindrical formed work, work having unusual contours or those requiring angular faces on lengthy jobs.

The Model 1212 High Precision Cylindrical Grinder—5 by 12 inch capacity—fills a demand for a hand operated machine that can be used for grinding small batch work to extreme accuracy. One of its many

April, 1960



(Left) Model 1215 Form Tool Grinder and (Right) Model 1400 Surface Grinder.

features is the super sensitive cross traverse of the wheelhead.

The Model 1310 Precision Grinding Machine—8 by 18 inch capacity—fulfills, in combination with the other

models of the 1300 series, the need for machines for grinding small components to precise limits on a production basis or for toolroom purposes.

For more data circle 196 on Postpaid Card



DIAL CALIPERS

Model UR68E

Sizes: 6" (illustrated)
8" and 10"

from \$30 (without case)

PRECISION

MEASURING

INSTRUMENT



VERSATILE, ACCURATE, TIMESAVING, EASY TO READ

Send for the complete catalog of

HELIOS QUALITY INSTRUMENTS

VISIT BOOTH #1561 AT THE ASTME SHOW

ONE OF MANY

United States Representative

KARL A. NEISE

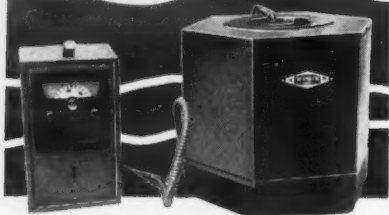
DEPT. MM, 404 4TH AVENUE
NEW YORK 16, N. Y.

NEISE
MODERN TOOLS

For more data circle 619 on Postpaid Card

multipurpose
electric furnace
with factory-planned
accessory groups

THERMOLYNE



**THERMOLYNE
TYPE 2100**

for small parts and short runs...
top-loading... 6-5/8" dia., 11-1/2"
deep chamber

With choice of six functional accessory groups, this one furnace lets you perform several distinct operations. Accessories make it adaptable as a salt bath, oil bath, melting, vertical muffle, or crucible furnace. Conversion from one operation to another is made quickly, easily, and safely, even when furnace is hot. Compact shape, triple insulation. Operating temperatures to 1650°F continuous, 1900°F intermittent. Automatic or semiautomatic controls available. Price of basic furnace without controls or accessories, \$170. Accessory groups from \$22.75. Write for literature and name of nearest dealer.

**THERMO ELECTRIC
MANUFACTURING CO.**

488 Huff St., Dubuque, Iowa

For more data circle 620 on Postpaid Card

ASTME Tool Show ...

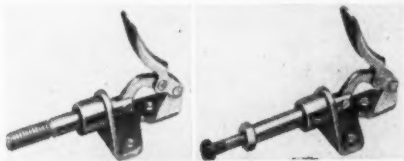
TOGGLE CLAMPS

Three plunger type toggle clamps and an expanded and improved line of miniature and pneumatically operated clamps will be the featured display of Detroit Stamping Co., 350 Midland Ave., Detroit 3, Mich., in Booth 1054.

Models 601 and 601-O were designed principally for general purpose use in light assembly work of the electronics, aircraft and allied industries. Both clamps lock in either an extended or retracted position. Model 601 has a tapped hole in the plunger to take a rubber tipped adjustment spindle and a locknut for extending or shortening its reach. The 601-O has a 1/4-20 thread on the plunger end to allow easy positioning of various holding devices. Rated holding pressure of both clamps is 95 pounds.

The Model 666, with a rated holding pressure of 450 pounds for medium duty holding applications, features a swivelling handle and a narrow base for use where clearance requirements do not permit using conventionally designed clamps. The handle swivels in a 220 degree arc and can be fixed in any position within this arc by a locknut located on the axis of rotation. A tapped hole in the plunger allows the use of an adjusting spindle for extending its reach.

Base mounting holes, which are provided on all three clamps, are located in a manner to facilitate positioning the clamps on standard tooling and aircraft industry assembly plates.



Models 601-O (Left) and 601 (Right) Clamps.

In addition to the featured display, the De-Sta-Co exhibit will contain the entire line of standard clamps, spacing products and stampings.

For more data circle 197 on Postpaid Card

★ modern machine shop ★

STAMPINGS AND STAMPING METHOD

In Booth 950, Federal Tool and Mfg. Co., 3615 Alabama Ave., Minneapolis 16, Minn., will show large displays of standard short run stampings and various metals and plastic materials. Federal will also show parts done with its new Combin-O Process. This new short run stamping method permits Federal to eliminate from one to four operations over those previously used. Special short run stamping dies enable a number of forming operations to be combined into one. One stamping, which formerly required seven operations, is now completed in three. One

which required five operations is now done in two. There are considerable time savings which, of course, are reflected in lower stamping costs.

A panel, showing a number of these Combin-O method stampings, will be on display for the first time.

For more data circle 198 on Postpaid Card

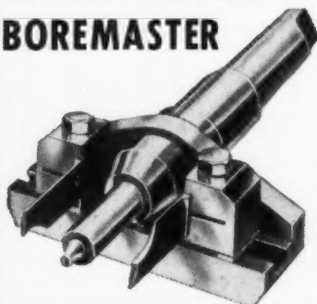
★ modern machine shop ★

END MILLS

The latest advancements in metal cutting tools will be exhibited by Eclipse Counterbore Co., Detroit 20, Mich., in Booth 1239.

For the first time, new additions to the Eclipse line of standard end mills will be shown. The new sizes include up to 2½ inch diameters in various styles; two flute single end in stub, medium and long lengths; four, six and eight flute single end in regular, medium, long and extra long lengths, also single end ball type.

BOREMASTER



For Holes
and Cores
in One
Operation

Bores 6" hole in 3¼" Machine Steel in 6 minutes.
Bores a 5" hole in Boilerplate in 80 seconds.

- Rigid and Heavy-Duty
- Saves Time
- Saves Material (cores intact)
- With or Without Retractable Pilot
- Write for the illustrated catalog and learn of the other advantages meaning HIGHER PROFITS FOR YOU
- Excellent Chip Load Distribution
- Easy Cutting
- 5 sizes for 1½" to 11¾" dia. work to 8" depth

Visit Booth #1561 at .. ASTME Show

Sole U. S. Representative **KARL A. NEISE**
Dept. MM, 404 4th Avenue, New York 16, N. Y.

ACCURATE
TREPANNING

THE
BOREMASTER

NEISE
MODERNTOLS

For more data circle 621 on Postpaid Card

ASTME Tool Show . . .

These end mills are form milled and have precision ground form relieved lands. They are engineered with the same geometry as the Eclipse ground-from-the-solid end mills, having strengthened keen cutting edges and smoothly blended flute contours with no sharp edges or corners. This design is said to provide better chip clearance, greater production and longer life.

For more data circle 199 on Postpaid Card

★ modern machine shop ★

PRECISION OPTICAL COMPARATOR

In Booth 560, R-O Mfg. Co., 31171 Stephenson Highway, Madison Heights, Mich., will exhibit for the first time its new precision optical comparator for mounting on R-O Grinders in

conjunction with the R-O Universal Form Relieving Fixture and Grinder. Simple adjustments enable the R-O fixture to relief grind tools with varying degrees of radial, axial or a combination of both radial and axial relief. Although the R-O will be shown as a complete unit, individual components, such as fixture, grinder and base, may be purchased separately.

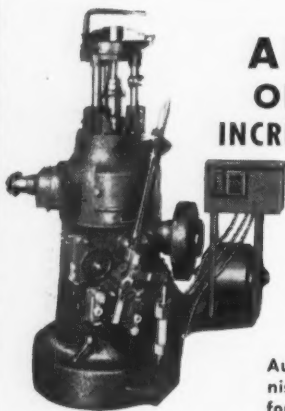
The comparator is equipped with a 20x magnification lens and swings in and out of position for checking progress of grind without disturbing the setup. A horizontal table measuring device, which mounts on the grinder and permits faster positioning of the tool to the wheel, will be introduced by the company.

For more data circle 200 on Postpaid Card

★ modern machine shop ★

BORING TOOLS

In Booth 467, Flynn Mfg. Co., 18301 Weaver, Detroit 28, Mich., will be dis-



Super High Speed AUTOMATIC FEED OIL GROOVING MACHINE INCREASES PRODUCTION—CUTS COSTS

The first and only Automatic Feed Oil Grooving Machine. Enables operator to run more than one machine, with every cut identical. WICACO CONTINUOUS OIL GROOVER cuts grooves of every description, internal or external, continuous or intermittent. Can be fitted with pneumatic holding fixture, synchronized with Automatic Feed. Send us samples for grooving to specifications, time and cost estimate, without obligation.

Automatic Feed Mechanism can be supplied for older machines. Ask for descriptive booklet.

Manufacturers of PRECISION MACHINERY,
MACHINE PARTS, SCREW MACHINE PRODUCTS,
Roller Bearing Twister Spindles,
Spindle Oiling Machines.

WICACO

SINCE
1868

MACHINE CORPORATION

4803 Stenton Ave., Phila. 44, Pa.
Telephone Davenport 9-4414

For more data circle 622 on Postpaid Card

WALTER PRECISION ROTATION

NEW!

MODEL YT/W-HU



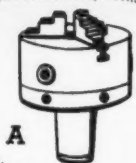
Walter
Semi-Universal
VERTICAL-HORIZONTAL
DIVIDING HEADS

accessories:

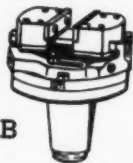
- (A) Three-jaw chuck.
- (B) Vise—self-centering.
- (C) Carrier with center.
- (D) Fixed tailstock.
- (E) Versatile drilling fixture.
- (F) Supplementary plates for drilling fixture.
- (G) Circular table (faceplate).
- (H) Taper clamping device.
- (I) Collet clamping device.

Many other dividing heads and rotary table models and sizes available. Complete catalog including prices and test reports mailed upon request.

VISIT BOOTH 1561 At The ASTME SHOW



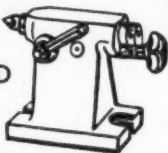
A



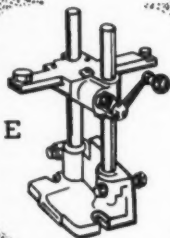
B



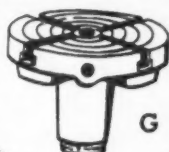
C



D



E



G



H



I

Sole Agents for U.S.A.

KARL A. NEISE
Dept. MM, 404 4th Ave., New York 16, New York

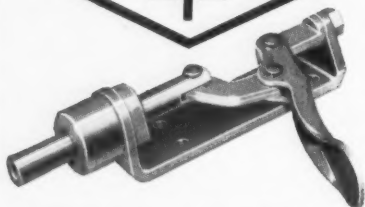
**NEISE
MODERNTOLS**

For more data circle 623 on Postpaid Card



IT'S A FACT

YOU CAN DO BETTER WITH



TOGGLE CLAMPS

... because you can choose from over 140 models—and thirteen basic styles, or even have them adapted to your own special needs.



FOR MORE FACTS

CHECK BOOTH 1054
DETROIT TOOL SHOW

YOU CAN

DEPEND ON DE-STA-CO

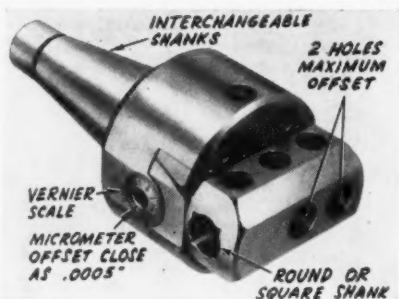
DETROIT STAMPING COMPANY

350 MIDLAND AVENUE
DETROIT 3, MICHIGAN



For more data circle 624 on Postpaid Card

ASTME Tool Show ...



Flynn Series "60" Offset Boring Head.

playing its line of offset boring heads, boring bars, boring tools and thread measuring sets.

The main feature of the exhibit will be the recently introduced Series "60" Round Contour Offset Boring Head with a long and stockier tool block for better securing the horizontal tool and permitting heavier cuts. The horizontal hole is broached for holding both round and square tools. Two vertical mount holes are made possible by the longer tool block; one is centered in the block and the second is offset, greatly increasing the amount of overall offset that can be obtained.

Introduced with the Series "60" is a vernier on the body, which facilitates adjustment of the micrometer offset screw, making possible extremely close visual offset adjustment. This same feature is now included in Flynn Series 30 and 40 Heads.

For more data circle 201 on Postpaid Card

★ modern machine shop ★

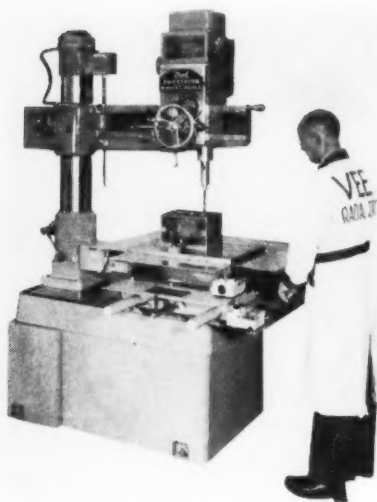
RADIAL DRILLS AND MILLING HEADS

High productivity is the keynote of the newest Veet Precision Radial Drills. Outstanding in this regard are the new double end, two level radials

which permit one operator to be setting up large workpieces (up to 62 inches under the spindle) on the low base, while a second operator is drilling smaller work on the work-height table at the opposite end. A new cast X-member base supports the heaviest loads.

A new universal-angle work table is available for use with all Veet Radials. Designed for the heaviest drilling loads, this 18 by 24 tee slotted table indexes 45 degrees either side of horizontal. Tee slots on the side provide clamping surface for overhanging workpieces, and a vee slot provides means of clamping round pieces and shafts. High rigidity results from the cradle construction.

The new cabinet base on all five Veet Radial Drills provides storage space inside for tooling and accessories within easy reach of the operator. A drill rack swings out with the door, carrying a full set of taper shank drills from 1/2 to 1 1/4 inches by sixteenths.



Radial Drill with automatic spacer table.

April, 1960



YOU CAN DO BETTER WITH



PACKAGED PRODUCTS

SHIMSTOCK, for instance, precision rolled from selected materials. Free of burrs or rough edges in sheets or rolls. Also Feeler Stock, Arbor Spacers and Shims ready to ship.



DETROIT STAMPING COMPANY

350 MIDLAND AVENUE
DETROIT 3, MICHIGAN



For more data circle 625 on Postpaid Card

MODERN MACHINE SHOP 333



*When
Mistakes
Happen . . .*

— and they do in every shop —
you'll find that the ideal tools for
removing excess welds . . . blending
in castings or molds . . . removing tool
marks . . . or putting keyways into
hardened metal parts . . . are —

KELLERFLEX®
CARBIDE BURS . . .

AVAILABLE FROM STOCK IN A COMPLETE RANGE OF
SIZES AND SHAPES AT THE P&W BRANCH OFFICE NEAR YOU.

For more data circle 626 on Postpaid Card

ASTME Tool Show . . .

The Veet Radials, complete with universal-angle work table together with the new "High Pro" Veet Speed-miller Milling Head for planer conversion, will be demonstrated, under power, in Booth 904 by Veet Industries, East Detroit, Michigan.

For more data circle 202 on Postpaid Card

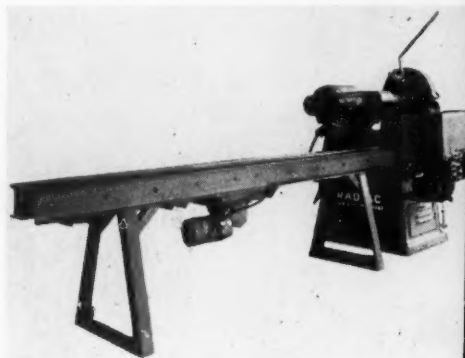
★ modern machine shop ★

CUT OFF MACHINES, GRINDING WHEELS

In Booth 2108, A. P. deSanno and Son, Inc., Phoenixville, Pa., will show two new abrasive cut off machines, which will be used for demonstrating the cutting of steel. Also on display will be Radiac Grinding Wheels, mounted stones and specials such as abrasive cut off wheels used on portable saws and cup wheels used on

portable grinders for grinding concrete.

The two new cut off machines are the Radiac Fully Automatic Abrasive Cut Off Machine, Type "N16-FA" (wet cutting), for fast, accurate pro-



Radiac Type "JOAH" Wet Cutting Abrasive Cut Off Machine is shown with work rest.

duction cutting of solids up to 1 inch diameter automatically; and the Radiac Abrasive Cut Off Machine Type "JOAH" Wet Cutting for fast, accurate cutting of solids up to 4 inches round or square.

For more data circle 203 on Postpaid Card

★ modern machine shop ★

DIES, GRINDERS AND GRINDING FIXTURE

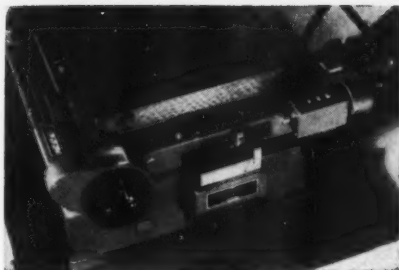
In Booth 1045, Harig Mfg. Corp., 5765 West Howard St., Chicago 48, Ill., will show carbide and steel dies, surface grinders and the improved Grind-All Fixture.

For more data circle 204 on Postpaid Card

★ modern machine shop ★

TOOLMAKERS' MICROSCOPE WITH RESET COUNTERS

In Booth 845, Gaertner Scientific Corp., 1275 Wrightwood Ave., Chicago



The Gaertner Toolmakers' Microscope features new reset revolution counters.

14, Ill., will display the Gaertner Toolmakers' Microscope with new reset revolution counters. These counters permit direct reading to three decimal places, with the fourth decimal place appearing on a simplified drum. They are available on new Toolmakers' Microscopes and in kit form for installation on instruments in use.

For more data circle 205 on Postpaid Card

teamed with a KELLERFLEX® FLEXIBLE SHAFT MACHINE

Finest, most dependable machines for burring, filing, sanding, grinding, polishing, wire brushing . . . and many other jobs. Easy to use . . . operator holds only the light handpiece . . . powerful motor is supported by stand. Versatile "Series M" Machines provide 16 speed changes.

Available with 1/2 to 1 hp. motors.

Convertible stand provides floor stand, bench or suspension mounting.

Write for complete information on KELLERFLEX Burs or Machines. Pratt & Whitney Company, Incorporated, 25 Charter Oak Boulevard, West Hartford, Connecticut



PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 627 on Postpaid Card



FORM-TRUE Grinding Wheels

TO "TENTHS" ACCURACY IN MINUTES!
Form complex grinding wheel shapes in minutes
... re-true same shape as often as required. You'll produce better dies, punches, form tools etc. in hours instead of days. Light, portable, easy to use ... and available in the right size and type for your form-grinding machine. Write now for complete information.

 **diaform** **WHEEL FORMING ATTACHMENTS**

For more data circle 628 on Postpaid Card

ASTME Tool Show ...

STEEL AND SINTERED CARBIDE PRODUCTS

Firth Sterling, Inc., 3113 Forbes Ave., Pittsburgh 30, Pa., will present its steel and sintered carbide product lines in Booth 461. Tying in with the show theme of "Tooling for Productivity," Firth Sterling will feature "Progressive Metallurgy for Productive Tooling."

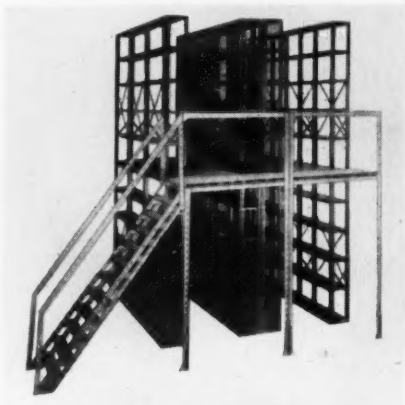
The Steel Division will display high speed steel, tool and die steels and the Hopkins' process of melting high temperature alloys and tool and die steels for special applications.

The Carbide Division will feature carbide grades for machining and forming, as well as its refractory materials, particularly pure forgeable tungsten, molybdenum and tungsten-molybdenum alloys.

For more data circle 206 on Postpaid Card

NEW MATERIAL PERMITS DOUBLE SHELF AREA IN SAME SPACE

Up to 100 percent more available shelf space in the same floor area is



View shows Equipto Floor Grating System.

said to be possible with a new floor grating system, which will be shown in Booth 954 by Equito, Aurora, Ill.

Present shelving can be extended, as the ceiling height permits. Then inexpensive non-skid steel catwalks are installed, with an access stairway. Modular design permits custom fitting of any installation, while mass produced interchangeable components keep the cost low. The above illustration shows double decked shelving with total height of 14 feet and catwalk at the 7 foot level.

The same components can be used to build a second or mezzanine floor, even where no shelving exists.

For more data circle 207 on Postpaid Card

★ modern machine shop ★

MILLING CUTTERS

In Booth 334, Lovejoy Tool Co., Inc., Springfield, Vt., will exhibit its full line of inserted tooth milling cutters,

including the "Joydex" Cutters with disposable carbide insert blades. Included in this latter line will be the new 12 inch diameter Joydex recently running between sharpenings at up to 359 cubic inches stock removal per tooth. Smaller Joydex Cutters will be shown in operation cutting steel.

Other items on display will be Lovejoy Arbors, flywheels, end mills, honing stones and so on.

For more data circle 208 on Postpaid Card

★ modern machine shop ★

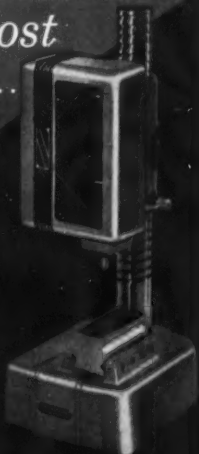
HOLE PUNCHING UNITS AND PRESSES

In Booth 1742, Punch Products Corp., 3812 Highland Ave., Niagara Falls, N. Y., will display Unipunch Type AJ Units, which feature all steel cast holders and provide longer life by combining higher tensile strength and longer wear plus greater bearing surface for punch guides. In addition,

HIGH Precision at LOW Cost

THE PRATT & WHITNEY SIGMATIC COMPARATOR...

a moderately priced instrument that combines the simplicity and dependability of mechanical gaging with unusual accuracy. Magnification range from 300X to 5000X. Repeatability to millionths of an inch. Self-contained, readily portable. For a wide range of external gaging operations. Ask for Circular No. 599, Pratt & Whitney Company, Inc., 25 Charter Oak Blvd., West Hartford, Conn.



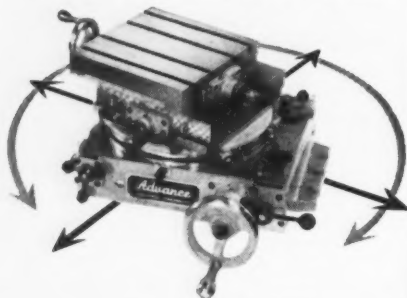
PRATT & WHITNEY

FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS

For more data circle 629 on Postpaid Card

Advance.

CROSS SLIDE ROTARY TABLE



FAST, PRECISE milling of dies and molds by eliminating conventional rotary table "set-ups". Hundreds in die, mold, and tool shops.

ADVANCE PRODUCTS CORP.

BENTON HARBOR, MICHIGAN

For more data circle 630 on Postpaid Card

Torque Wrench Adapter Calculator Slide Rule

Free

Instantly calculates scale conversion factors for adapters of different lever lengths—set it and read it.

Provides automatic selection of proper torque wrench for adapters and/or proper adapters to go with given torque wrenches.

Send free upon request
Compliments of

PA **STURTEVANT CO**
ADDISON QUALITY ILLINOIS

For more data circle 631 on Postpaid Card

ASTME Tool Show . . .

these units are available with either pedestal dies or die adapters with button dies.

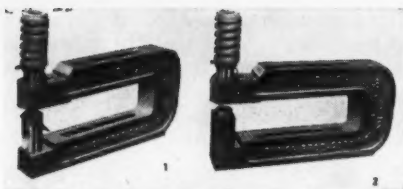
The AJ Units are companions to the Type A Series and they permit interchangeability of replacement parts between these two, as well as with units and parts of other leading manufacturers.

In keeping with the entire line of Unipunch Series A Hole Punching and Notching Units, this AJ Series has the standard 8 $\frac{3}{8}$ inch shut height and 3 $\frac{1}{2}$ inch die height, permitting all these units to be used in the same setups. Punches and dies are held in perfect alignment by the holders which also maintain accurate concentricity between punches, dies and pilot pins—the basic principle of Unitized Tooling. These holders have greater bearing surface for the punch guides, than previously available in this type of holder.

Removable punches and dies are designed for quick, easy replacing or changing for punching various diameter holes. Punches are made in two pieces—(1) punch head and (2) punch body for inexpensive punch body replacement.

AJ Units are available in 1 $\frac{1}{4}$, 1 $\frac{1}{2}$ and 2 inch holder widths with 4, 8 and 12 inch throat depths for punching holes in up to $\frac{1}{4}$ inch thick mild steel.

The Unipunch Press Model 1012, equipped with precision Unipunch Gauging and Tooling, is ideal for fast, economical hole punching in angles, channels, extrusions and sheets, plus notching operations. 37 round punches and 74 dies with four Unipunch Hole Punching Units and one Unipunch Notching Unit are available with this press. These units provide rapid interchangeability of punches and dies for various hole diameters. In addition to punching round and shaped holes and



(1) Typical Unipunch Type AJ Hole Punching Unit equipped with pedestal die. (2) Typical unit shown with die adapter and die button.

notching corners and edges, this press may be used for punching extruded and countersunk holes, small louvers and lanced holes. Small die sets may be installed for making stampings. Threaded nut inserts also may be pressed into sheets or parts. Heeled punches and dies are available for hogging out larger diameter holes and shapes than the maximum 2 inch diameter holes provided with standard units. With a template, several units

may be set up for making a cluster hole pattern in place of expensive custom punches and dies.

For more data circle 209 on Postpaid Card

★ modern machine shop ★

SPECIALTY STEELS

In Booth 539, the major feature of the Carpenter Steel Co., Reading, Pa., exhibit will be to highlight evidence of how its specialty steels are providing the ultimate in predictable performance. This is made possible through Carpenter's Mel-Trol Steel-making Process, which produces specialty steels with maximum soundness and uniformity.

Mel-Trol is a quality control system which keeps impurities to a minimum, reduces segregation and holds properties within tight limits. It is accomplished by an ingot mold, plus

- ANY COMBINATION of ... Turning ... Tapering ... Facing ... Chamfering ... Trepanning in ONE PASS.
- Exclusive MICROMETER Adjustment Feature For Rapid Set-Up.
- Cutting Capacities from 1/32" to 2" Diameter in Standard Stock Immediate Delivery.

WRITE FOR CATALOG 20-MM

KUTMORE

ADJUSTABLE HOLLOW MILLS

PRECISION
STARTS
HERE:

CARL WIRTH & SON, INC.

1625 CLINTON AVE. NO. ROCHESTER 5, N.Y.

For more data circle 632 on Postpaid Card

ASTME Tool Show . . .

scrap, composition and temperature controls. The unique ingot mold is designed to extract heat rapidly at the bottom of the ingot. It promotes solidification from the bottom up, trapping impurities at the top of the ingot. The top is cut off and discarded.

Case studies will be displayed to indicate how customers are benefitting

from increased service life, fewer rejects, more dependable performance of tools and parts made possible from Carpenter Specialty Steels produced by the Mel-Trol process.

For more data circle 210 on Postpaid Card

★ modern machine shop ★

MACHINERY MOUNTS

In Booth 1420, Barry Controls, Inc.,
700 Pleasant St., Watertown 72, Mass.,

will introduce
Sera-Levl Ma-
chinery Mount.

The Barry Air Mount for absolute leveling of precision machinery will maintain machine level within 0.0005 inch automatically. It requires only 85-100 p.s.i. standard air pressure, dirt-air filter; no special foundation. Barry Air Mounts are installed under the mounting points of the machine, simply by raising the machine and sliding the mount in. Standard industrial air supply is then connected and the machine leveled by turning the height adjustment screw with an Allen wrench. The leveled machine now floats on a column of air, automatically adjusted to maintain machine level

Save Money...Save Time

by using

STANDARDIZED THREAD ROLLS

For Nos. 83 and 84 Brown & Sharpe Holders,
Reed Series A Holders and other
similar Type Single Roll Holders

Both tool engineers and purchasing departments appreciate the saving of time, effort and money made possible by being able to order Reed standardized thread rolls by type number only, without the necessity of submitting drawings and specifications.

ROLLS for COMMON STRAIGHT THREADS and TAPER PIPE THREADS CARRIED IN STOCK

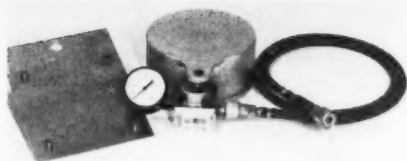
For Your Convenience in Ordering
Standardized Thread Rolls and Holders
Write for Thread Roll Bulletin 1-17 and Price List



REED ROLLED THREAD DIE CO.

Specialists in Thread and Form Rolling Tools and Equipment
Holden, Mass., U. S. A.

For more data circle 633 on Postpaid Card



The Barry Serva-Levl Machinery Mount.

within 0.0005 inch. As load on the mount increases, a corresponding increase of air pressure in the mount compensates to retain absolute level. The pneumatic signal is linear with load, and a decrease in load is accompanied by a decrease in air pressure. The p.s.i. of the column of air is controlled by a valve and height adjustment screw. As load on the support point increases, the height adjustment screw forces the valve to open to the factory air supply source, allowing enough air to enter to increase pressure and compensate for increased

load. When load decreases, the screw opens a vent, allowing enough air to escape to compensate. A damping orifice between the support diaphragm and the damping chamber prevents too sudden changes in relative pressure, avoiding quick movements of the supporting point.

In addition to the new Serva-Levl Mount, Barry will exhibit its standard line of leveling mounts and spring mounts.

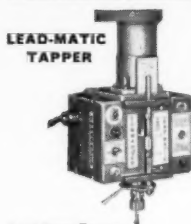
For more data circle 211 on Postpaid Card

★ modern machine shop ★

COMBINED FLUORESCENT-INCANDESCENT LIGHTING

In Booth 1067, the display of Dazor Mfg. Corp., St. Louis, Mo., will contain a new floating arm model in which fluorescent and incandescent lighting are combined in one vented reflector. The result is a blending of the good

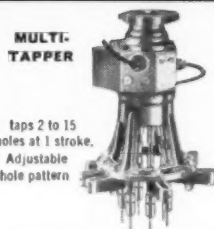
COMMANDER TAPPERS



Lead Screw Tapper
Range: 0-80 to 1/4"-16



High Production,
Air Operated
Range: 0-80 to 1/4"-16



Multi-Tapper
taps 2 to 15
holes at 1 stroke.
Adjustable
hole pattern



Pressure Sensitive Drive
Range: 0-80 to 10-24



STANDARD
TAPPER

Adjustable
Torque Control
Range: 0-80 to 1/4"-16

a Type and Size for Every Job!

Commander Tappers are made in 10 models — each designed to handle tapping jobs over a wide range. From the Commander Tapper line, you can select the right unit to give you the exact performance your job requires. Whichever Commander Tapper you select, you will get unequalled performance and tapping economy. Sold and serviced by drilling and tapping specialists. Write for the Commander Production Tool Catalog and name of nearest Distributor.



See us at Booth 313, ASTE Show, Detroit

Commander MFG. CO.

4224 W. KINZIE STREET
CHICAGO 24, ILLINOIS

For more data circle 634 on Postpaid Card

ASTME Tool Show . . .



Dazor Fluorescent and Incandescent Lamp.

qualities of each type, resulting in the retention of true color values. This is of special value for certain operations,

whether the work station is a machine, assembly or inspection bench, drawing board or desk. A 22 watt Circline tube is the fluorescent source and a 60 watt bulb supplies the high intensity incandescent light. Users have a choice of four bases—universal (clamp-on or screw-on type; see illustration), bracket, desk or pedestal. Five colors are optional. When either type of lighting is desired alone, it may be switched on independently.

All other Dazor Lamps and Magnifiers, which contribute to accuracy and productivity of the individual, will also be on display. Included are floating arm, adjustable arm and flexible arm models.

For more data circle 212 on Postpaid Card

★ modern machine shop ★

TWO POSITION SLIDE TABLE

In Booth 1450, Russell T. Gilman, Inc., 624 Beech St., Grafton, Wis., will

Specify . . .

INTERAPID

DIAL TEST INDICATORS

for New Improved Features



FAMOUS Model I-D Swiss made indicator with new improved features, now sold under the name INTERAPID. FEATURES: Stem cap adjust zero position, Positive zero lock, Stationary dial (zero always at top of instrument), Dust proof bezel (bezel does not move), One-piece forged steel case.



The INTERAPID Dial Test Indicators offer a new concept in design and versatility. Some of the salient features are: A stainless steel body, Anti magnetic, An easier to read tilted dial, Automatic shiftless reversing, Carbide contact point, Greatly reduced contact pressure, Precise repetitive readings.

Available in .0005" and .0001" models, with 1" and 1½" diameter dial sizes. Model 310 B-1 is illustrated with 1½" dial and .0005" divisions.

Write for more information or phone

BOREL & DUNNER, INC.

19313 Farmington Rd. Kenwood 3-0878 Livonia, Michigan

Booth No. 1557, ASTE Show, Detroit, April 21-28.

For more data circle 635 on Postpaid Card

display a two position slide table. Applications include (1) Turret type drilling machines incorporating the use of two work fixtures for holding identical piece parts. One station in process being machined, while the other station is open for loading and unloading. This is only of value when the machining cycle is long enough to allow time for loading and unloading parts. (2) Turret type drilling machines performing machining operations in two positions on one workpiece. With this method, several of the tool positions on the turret will provide operations in one position, after which the table will shift and the additional tool positions on the turret will perform operations in the second position. The adjustable stops will provide an infinite variation of hole centers from 1 to 15 inches. (3) Multiple drill head type machines allowing two clusters of drills to work on the same workpieces, such as one cluster drilling in one position and second cluster counterboring in second position. The possibility of drilling holes in a workpiece on close centers is also an important tooling possibility on the two position slide. (4)

Multiple spindle boring machine operations can use this slide to automatically position the workpiece first in front of one spindle and then shift in front of the second spindle.

The slide sections are made of high tensile cast iron, properly stress relieved and machined. The top and bottom surfaces are precision ground to provide smooth, accurate mounting surfaces. Dovetail wear surfaces are hand scraped for greater life and smoothness in operation. These surfaces are lubricated through a cen-

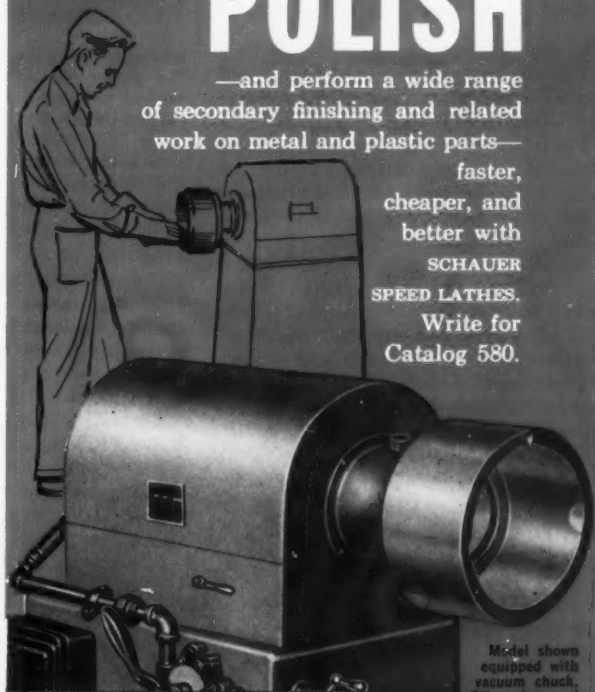
POLISH

—and perform a wide range of secondary finishing and related work on metal and plastic parts—

faster,
cheaper, and
better with

SCHAUER
SPEED LATHES.

Write for
Catalog 580.



Model shown
equipped with
vacuum chuck.
Other sizes and
types available.

SCHAUER
MANUFACTURING CORP.

4501 ALPINE AVE.
CINCINNATI 42, O.

For more data circle 636 on Postpaid Card

ASTME Tool Show . . .



Model TP12-30-15 Two Position Slide Table

tralized lubrication system, manually operated.

For more data circle 213 on Postpaid Card

★ modern machine shop ★

STANDARD SUBLAND DRILL LINE

In Booth 327, Mohawk Tools, Inc., 920 Main St., Montpelier, Ohio, will exhibit a complete line of "standardized" Subland Drills.

This new line, known as the Mohawk Standard Subland Drills, includes the three basic operational types which are: (1) Subland Drill-Chamfer—for regular taps, fluteless taps, pipe taps and coil-insert taps; (2) Subland Drill-Counterbore—for socket head cap screws; and (3) Subland Drill-Drill for tap drill and body clearance and bolts, studs and screws.

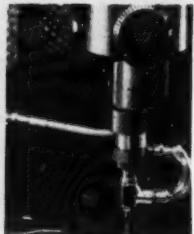
The new Mohawk "Standards" have been developed in all practical sizes and combinations, in three step lengths and three shank styles to suit virtually every conceivable need.

All styles, types and sizes are ready for immediate "off-the-shelf" delivery. For more data circle 214 on Postpaid Card

★ modern machine shop ★

AIR DRIVEN CUTTING AND GRINDING INSTRUMENT

Extremely hard materials, such as ceramics, glass, carbides and super hard metals, can be machined with diamond and carbide tools used in the Airotor, new air driven cutting and



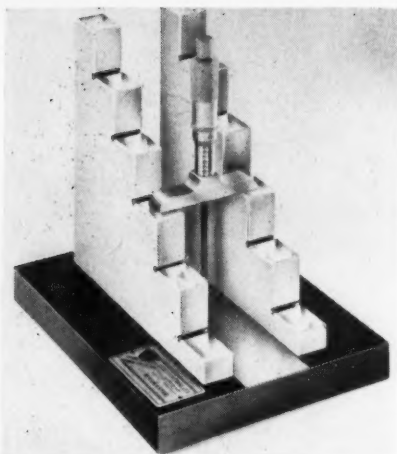
Airotor is shown on three different operations. Top shows the Airotor being used with a vertical milling machine, producing 1/16 inch keyway in 62 R. C. hardened tool steel. At lower left Airotor is shown as a hand tool, cutting identification letters in a Stellite die. The jig borer at the lower right utilizes the Airotor in an offset boring head to enlarge drilled holes in 1/4 inch hardened steel plate.

grinding tool. The Airotor is an industrial adaptation of the dental instrument. It operates at spindle speeds in excess of 300,000 r.p.m.—can be used for a variety of jobs such as small holes, grooves, slots or die cavities.

The Airotor can be used as a hand tool or can be quickly adapted for use with jig borers, lathes, milling machines and pantographs. Because of its extremely high speed, the Airotor removes metal at an unusually fast rate.

An air supply of 1.25 c.f.m. at 40 p.s.i. is all that is required. A furnished control unit regulates, filters and lubricates incoming air. Standard shop air lines can be used. A complete line of carbide burs and diamond mounted points is available. The Airotor will be exhibited in Booth 1417 by The Ashcombe Co., 1320 West Market St., York 31, Pennsylvania.

For more data circle 215 on Postpaid Card



Size Control's new Depth-Mikemaster

MICROMETER SETTING DEVICE

In Booth 238, Size Control Co., 2500 West Washington Blvd., Chicago, Ill., will exhibit a new Mikemaster, known as the Depth-Mikemaster.

It was created to assure the accuracy of the setting of depth mikes, that rods are properly seated and adjusted and to eliminate scrap caused by improper measurements.

The Depth-Mikemaster is constructed of chrome plated hardened steel, with an accuracy of 0.0001 on each step. The range is 0.500 to 5.500 inches in six steps. By adding gage

blocks to steps, you can determine lead screw accuracy of micrometer and check mike to different sizes.

For more data circle 216 on Postpaid Card

★ modern machine shop ★

DIE FILERS

In Booth 839, Rice Pump and Machine Co., 226 Park Ave., Belgium, Wis., will display, in action, its com-

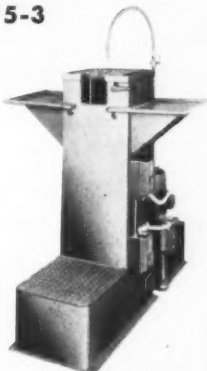
REDUCE MACHINING COST WITH **BROACHING** Model VM215-3

INTERNAL &
SURFACE
BROACHING
MACHINE

- 2-Ton—
15" Stroke
- Fully Hydraulic
- Fast Set Up
- Low Cost

\$1565.00

COMPLETE WITH
MOTORS &
SWITCHES &
COOLANT SYSTEM

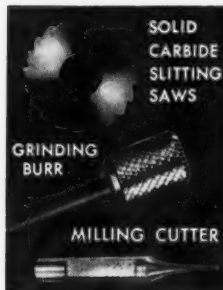


Write for Free
Literature

PIONEER BROACH COMPANY

6434 Telegraph Road
Los Angeles 22, California

For more data circle 638 on Postpaid Card



Tough cutting jobs are easier with new **DIXIE** tools.

New Dixie tools are now available for cutting materials currently used in the manufacture of rockets and missiles. Specially designed routers can be supplied by Dixie for the toughest and most unusual jobs. Dixie also manufactures the finest carbide tools for drilling, milling, and hole sizing.

SEND FOR OUR
NEW CATALOG

DIXIE TOOL INDUSTRIES
4555 W. FRANKLIN AVE.
BRIDGEPORT, MICHIGAN

For more data circle 637 on Postpaid Card

ASTME Tool Show . . .

plete line of die making machines for filing, sawing and lapping; bench models and floor models. Available in two speeds, four speeds and infinitely variable speeds from 100 to 475 strokes per minute, all models are available with infinitely variable strokes from 0 to 2 inches. Model PDM strokes are variable from 0 to 5 inches. Speeds vary from 80 to 350 strokes per minute. Model PDM table tilts 15 degrees right or left, stroke mechanism tilts 15 degrees to the rear. All other models have 15 degree four way tilting tables.

The Rice-Milwaukee Model PDM Punch and Die Maker has such features as tilting stroke mechanism, tilting table, infinitely variable speeds and strokes. Upper and lower arms are power operated. Two table sizes are available. The machine is designed to handle all small die making requirements.

For more data circle 217 on Postpaid Card

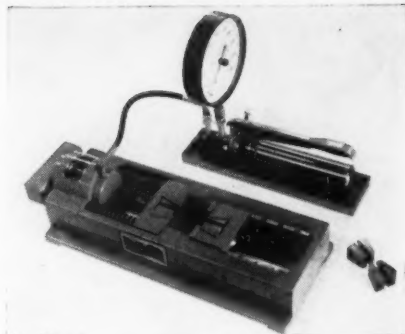
★ modern machine shop ★

TEST EQUIPMENT

In Booth 1526, Steel City Testing Machines, Inc., 8817 Lyndon Ave., Detroit 38, Mich., will exhibit tensile-testing machines and units that permit hardness tests to be incorporated into automatic production lines.

As industry prepares "Tooling for Productivity," more attention must be given to material specifications and the protection of expensive tools. Various physical-property-testing equipment will be on display, in operating condition, to show tool engineers what can be done to simplify material inspection and to automate inspection procedures.

In addition to the line of tensile-testing machines, test equipment for determining hardness and ductility and proving rings will be exhibited.



Model PT-40 Portable Tensile Tester

Qualified personnel will be on hand to discuss the uses of test equipment in production.

For more data circle 218 on Postpaid Card

★ modern machine shop ★

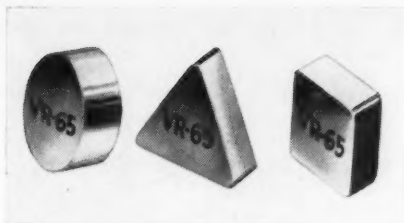
CARBIDE PRODUCTS

In Booth 1030, Vascoloy-Ramet Corp., Waukegan, Ill., will exhibit a complete line of cemented carbide and cast non-ferrous alloy products; blanks, tools, inserts, toolholders, milling cutter and ceramic inserts.

Featured will be VR-65, which is the first of a series of new cutting tool materials created and manufactured by Vascoloy-Ramet. This grade was developed to extend the range of conventional cemented carbides, as it operates at speed and feed ranges between today's carbide grades and ceramic materials.

VR-65 is a cemented titanium carbide with other metallic carbides used as alloying ingredients. It is fabricated by powder metallurgy in the same manner as conventional carbides. The material can be brazed to steel shanks and is ground by the conventional methods used with today's carbides.

Nominal hardness of 92.1 RA is within the range of today's harder carbide grades. Strength of 175,000



Vascoloy-Ramet Grade 65 Carbide

p.s.i. is appreciably greater than ceramic materials and is in the range of finishing grades of carbides.

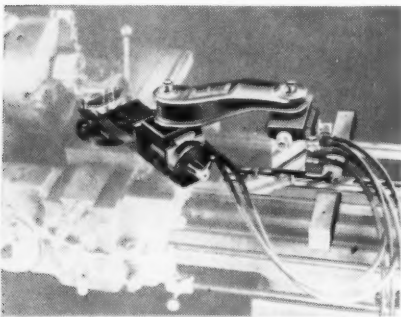
Metallographically VR-65 is characterized by the same freedom of porosity and fine grain structure as is common in conventional carbides.

The high titanium carbide content imparts excellent crater resistance and freedom from "build-up" when machining steel. The high hardness and fine grain structure provide high resistance to edge wear with very good "size-control" and fine surface finish. For more data circle 219 on Postpaid Card

★ modern machine shop ★

LATHE TRACING ATTACHMENT

In Booth 1831, True-Trace Corp., El Monte, Calif., will unveil a new tracing attachment, designed for lathes. Called the Model Mark II, it is

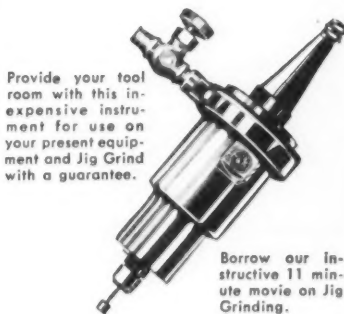


Mark II Pivot Type Lathe Tracer Attachment

being offered as an "off the shelf" type of application, ready for immediate delivery. No machine conversion is required as the attachment requires only minutes to install or remove. The Mark II Unit is of the pivot type design and is suitable for both shaft and facing duplication. The system is entirely hydraulic in operation.

Also scheduled for exhibit will be another new tracing attachment for

H O L E S JIG GROUND with *Vulcanaire*



Provide your tool room with this inexpensive instrument for use on your present equipment and Jig Grind with a guarantee.

Borrow our instructive 11 minute movie on Jig Grinding.

Your Tool Room in Dayton
Designers and Builders
Special Tools — Dies — Machines
Request Quotation



VULCAN TOOL CO.
731 LORAIN AVENUE
DAYTON 10, OHIO

For more data circle 639 on Postpaid Card



"Egads, sir . . . there's been nothing like 'em since the Flora Dora girls!"

Few performances can match the superlative grinding, smoothing, and polishing action of Jewel Brand Abrasive Belts. A trial run proves it! Order through your Industrial Distributor today.



COATED ABRASIVES

Belts • Rolls • Sheets • Discs • Specialties

ABRASIVE PRODUCTS, INC.

South Braintree 85, Massachusetts

Please send more information about cost-cutting Jewel Brand Abrasive Belts!

Name.....

Title.....

Company.....

Address.....

City..... State.....

For more data circle 640 on Postpaid Card

348 MODERN MACHINE SHOP

ASTME Tool Show . . .

turning applications, the Synchro/Traceturn, which will duplicate 90 degree shoulders and which operates at a uniform feed rate, regardless of shape of pattern or master being duplicated.

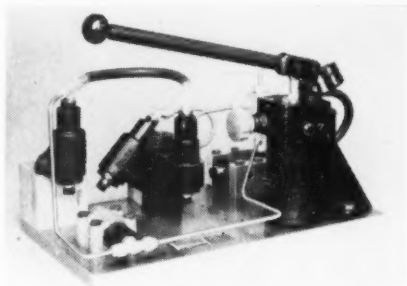
For more data circle 220 on Postpaid Card

★ modern machine shop ★

HYDRAULIC CLAMPING SYSTEM

A new hydraulic clamping system for use in all jigs and fixtures will be demonstrated in Booth 1627 by Newton Hydraulic Tool Co., Inc., Auburn, Massachusetts.

Basically, the Newton Hydraulic Tooling System is made up of a hand operated pump (screw or lever type), feeding a number of hydraulic cylinders and various holding or mounting devices. By powering all cylinders from a single pump, the system eliminates the necessity of tightening or loosening a multiplicity of nuts and bolts. Simply by operating the pump, a large number of cylinders apply equalizing pressures at each position. The system operates at pressures up to 2,000 p.s.i. The Newton System is self-contained, requiring no outside power source. An



The Newton Hydraulic Clamping System

April, 1960

unlimited number of clamping variations are possible. Clamping pressure is uniform at each cylinder location. In addition to material gains made in production time, due to reducing setup time, the Newton System is safe and simple to operate.

For more data circle 221 on Postpaid Card

★ modern machine shop ★

POWER QUILLS, ELECTRIC JIG GRINDER AND DRILLING UNIT

In Booth 127, Precise Products Corp., Blue River Rd., Racine, Wis., will show three major new developments, together with other important items in its program.

(1) Super Cycle Power Quills will be demonstrated running at constant speed under load in a range from 7,200 to 54,000 r.p.m. Power output at the chuck is available up to 2 h.p. These quills will be shown in three basic models, which are fully interchangeable with the company's line of Universal Motor Power Quills. A matching program of self contained portable high frequency converters will be featured. There will be compact single and four speed models, as well as the new continuously variable unit, allowing variable spindle speeds at constant load speed in a range from 7,200 to 60,000 revolutions per minute.

(2) Electric Jig Grinder. In a compact, high torque electric unit this jig grinder will convert any good vertical milling machine into a truly precision electric jig grinder, suitable for grinding or (with carbide) micromilling holes to tolerances of 0.0001 inch and closer, and surface finishes well within 10 micro inches. There will be three basic models shown in operation: one with an automatic feed, a second with manual feed and a third without feed mechanism to mount in jig grinders now using air driven spindles.

(3) Automatic Drill Unit—"Auto-drill"—is an unusually small, compact



"Good heavens, Ambrose . . .
you mean we're completely
out of them?"

Disturbing as it seems, people occasionally run out of Jewel Brand Abrasive Belts. Fortunately, they can replenish their supply quickly and easily through their nearby Industrial Distributor. Check your stock now!



COATED ABRASIVES

Belts • Rolls • Sheets • Discs • Specialties

ABRASIVE PRODUCTS, INC.

South Braintree 85, Massachusetts

Please send more information about
cost-cutting Jewel Brand Abrasive Belts!

Name.....

Title.....

Company.....

Address.....

City..... State.....

For more data circle 641 on Postpaid Card

ASTME Tool Show . . .

automatic drill unit. It is an air-hydraulic unit, which is electrically operated, with full control of feed and stroke.

It can be mounted in any vertical or horizontal position on 2 inch centers. It has ample power to drill holes of 5/16 inch in steel. It has a maximum stroke of 1½ inches and permits spindle speeds up to 6,000 revolutions per minute. It is only 2 inches wide, 12 inches long and 7 inches high.



Precise Power Quill

The portable Sklero Hardness Tester, the line of Vapor Lub Cooling Units and the extensive rotary tools program will

be other interesting items in the exhibit, which will be shown together with portable electric grinder-millers and power quills.

For more data circle 222 on Postpaid Card

DEBURRING AND CHAMFERING EQUIPMENT

In Booth 1818, Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 38, Mich., will show tool and manufacturing engineers how they can use Burr-Masters to improve gear quality all during the Show. Modern will be demonstrating operating machines, tooled up for production jobs.

Included in the exhibit will be a Model BMHPT-14 Hypoid Pinion Gear Tooth Topper, showing how to actually finish top edges of hypoid gear teeth. A second machine is a two station Model BME-24CE tooled to deburr and chamfer transmission cluster gears. This standard machine will show that burring and chamfering of gear teeth can be done in a groove or undercut without tool interference during loading or unloading.

Also to be in operation is a two station Model BMED-29S Chamfering and Topping Machine, set up to deburr and chamfer both ends of a Pitman shaft sector gear and to top its teeth. A single station Modern Grinder will be demonstrated, grinding the heel and toe ends of hypoid rear axle ring gears.

Qualified personnel will be in attendance in this booth so that production engineers can discuss their own individual problems, as well as see typical operations set up and running. For more data circle 223 on Postpaid Card

For Your Convenience . . .

the "Where to Get It" section of MODERN MACHINE SHOP provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 354, 356, 358, 360 and 362.)

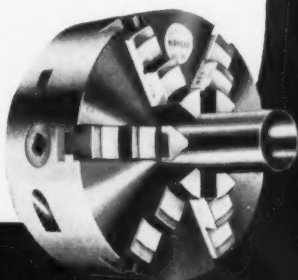
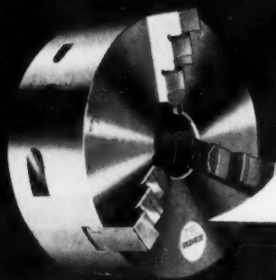
modern machine shop
431 MAIN STREET • CINCINATI 2, OHIO

.0002" TIR



MEANS UNMATCHED PRECISION

BURNERD GRIPTRU CHUCKS



Concentricity within .0002" TIR—on one piece or thousands—is the accuracy you can expect and get with Burnerd GRIPTRU chucks.

GRIPTRU's micro-adjusting mechanism eliminates the need for expensive collets, fixtures . . . saves time, speeds output . . . improves the accuracy of any machine tool, new or old. Perfect for tool room or production departments.

And GRIPTRU chucks are built to retain their greater accuracy under the toughest working conditions—Burnerd

chucks are *guaranteed for two years* against defects in materials and workmanship.

But that's not all. When you check prices, you'll be surprised . . . pleasantly surprised. Because GRIPTRU chucks cost you 20 to 30% less!

Other Burnerd chucks—3- and 4-jaw universals, and 4-jaw independents—offer the same outstanding values. Sizes range from 3 1/4" through 28". Get complete details by writing for descriptive literature today.

BURNERD CHUCKS **CLAUSING DIVISION**
ATLAS PRESS COMPANY

4-212 N. PITCHER ST. • KALAMAZOO, MICH.

For more data circle 642 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 351

TWELVE ACRES

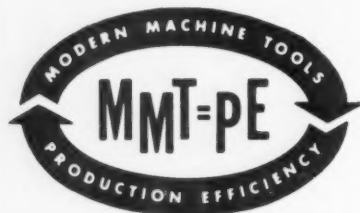
Figures, sometimes, can be very impressive.

Five exhibit halls . . . twelve acres of floor space.

Over a thousand new-model machine tools in operation.

One hundred thirty exhibitors.

One hundred twenty thousand top executives, production men, engineers, plant managers and educators in engineering fields expected to attend.



But more important than figures . . .
... the opportunity to view at first hand the latest and best in metalworking techniques.

... the opportunity to discuss time and money saving ideas with engineers who have made this field their lifetime work.

... the opportunity to compare what you now have with what you will be working with in the months and years ahead.

... the opportunity to view metalworking's future within the confines of twelve acres.

Plan now to attend THE MACHINE TOOL EXPOSITION - 1960 at the International Amphitheatre, Chicago, Illinois, Sept. 6 through 16.

ASTME Tool Show . . .

POWER PRESSES

Perkins Machine Co., Warren, Mass., will have on display two sizes of a new line of high speed presses in Booth 1438.

These new machines, capable of running at speeds up to 600 r.p.m., will show many advances in press design. Time-saving features for setting up and changing dies, as well as for maximum production, are built into this line of presses.

New features include: adjustable strokes in eight stroke lengths; self-locking ram adjustment, power actuated; air clutch and spring applied air release brake; air counterbalance; variable speeds with remote control and tachometer; calibrated top stop control. Presses in this line have capacity from 15 to 150 tons.

For more data circle 224 on Postpaid Card

★ modern machine shop ★

SEALANT

In Booth 1565, American Sealants Co., 103 Woodbine St., Hartford, Conn., will display an improved method of locking nuts to bolts, which is possible through the use of a new liquid plastic.

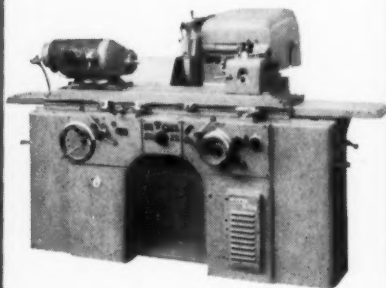
Loctite Sealant locks ordinary threaded fasteners so securely that no amount of vibration can shake them loose, yet they can be removed with ordinary tools.

Machinery designed for high operating speeds and parts subjected to increased levels of vibration can now be made more reliable through the use of this method of lock fastening. In aircraft assemblies, where both vibration and weight savings are of critical importance, Loctite-treated fasteners can improve built-in product quality and dependability.

For more data circle 225 on Postpaid Card

olivetti

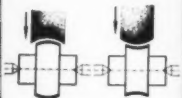
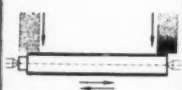
*high-precision grinding machines
with hydraulic automatic infeed
for traverse grinding and plunge grinding*



UNIVERSAL. Swivelling wheelhead, swing-down internal grinding attachment, infinitely variable speed headstock.

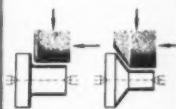
PRODUCTION. Larger grinding wheel, more horsepower, non-swivelling wheelhead, 8-speed headstock.

Model R4-500 U shown at left. Universal type, 10° swing, 24" center distance.



- Infinitely variable hydraulically controlled table speeds
- Table reversals within $\pm .0002''$ as short as $1/16''$
- Table dwell 0 to 20 seconds
- Automatic precision infeed to $.000050''$, right, left or both ends of traverse
- Thumb jog for taking $.0001''$ cuts on diameter
- Separate automatic plunge feed 0 to $.002''$ /second to positive stop

write Olivetti Corporation of America,
Machine Tool Division, 42-33 Northern
Boulevard, Long Island City 1, New York
Or phone RAvenswood 1-7575.



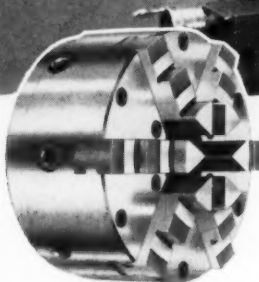
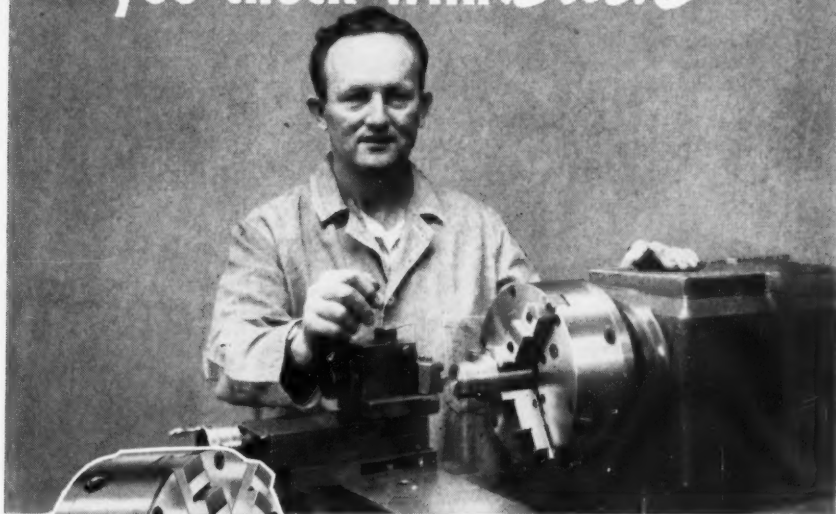
For more data circle 643 on Postpaid Card

Where to get it.

Numbers shown are the page numbers of advertisements and new equipment write-ups which appear in this issue.

- Abrasives, Grain, Cloth, Paper, Disc, etc., 58, 59, 91, 108, 216, 348, 349
Accumulators, 271
Actuators, 175
Adapters, 121, 279, 338
Air Operated Equipment
(Look for specific item)
Alloys, 32, 49, 83, 159, 244, 276, 285, 306, 336, 339
Amplifiers, 102, 283
Angles, 188, 242, 274
Arbors, 279, 337
Automated Equipment
(Look for specific item)
Bags, Shipping, 276
Balancing Machines, 15
Balls, Metal, 281
Bar Machines, Automatic, 230
Bars, Boring, 82, 259, 289, 293, 303, 330
Bases, Index, 226
Bearings, Ball, 100, 101, 117, 322
Bearings, Roller, 100, 101, 281
Bearings, Special, 100, 101, 282
Bearings, Thrust, 100, 101, 256
Bending Devices, 170, 258
Bending Machines, 103, 251, 254
Bits, Tool, 56, 317
Blades, Shear, 90, 280
Blocks, Angle, 280
Blocks, Pillow, 100, 101
Blocks, Riser, 188
Blocks, Step, 265, 310
Blocks, Vee, 188, 251
Bolts, 310
Boosters, 271
Boring and Milling Machines, 226
Boring and Turning Machines, 77, 249
Boring, Drilling, Reaming and Tapping Machines, Combination, 288
Boring Heads, 251, 329
Boring Machines, 39, 94, 95
Boring Units, 296
Brakes, Press and Bending, 44, 45, 206, 251
Broaches, 279, 317
Broaching Machines, 345
Brushes, Power, 247
Buffers, Bench and Pedestal, 316, 372
Buffing Machines, 54
Burners, 257
Burs, 159, 259, 334, 335, 344, 345
Bushings, Ball, 117
Bushings, Drill Jig, 82, 175, 246, 289, 395, 369, Inside Back Cover
Calipers, 310, 245, 327
Cams, 260, 281, 282
Carbides, 83, 108, 336, 346
Centers, Index, 287, 331
Centers, Lathe, Planer, Miller, etc., 98, 99, 195, 218, 239, 248, 255, 279
Chains, 113
Chamfering Machines, 103
Charts, Trigonometry, 119
Chasers, 208
Chilling Equipment, Industrial, 61, 315
Choppers, Scrap, 273
Chucking Units, 292
Chucks, Air and Hydraulic, 57, 272
Chucks, Automatic, 305
Chucks, Boring, 82, 289
Chucks, Collet, 82, 289
Chucks, Drill, 42, 187, 322
Chucks, Floating, 82, 289
Chucks, Hand, 292
Chucks, Lathe, 219
Chucks, Magnetic, 36, 64, 65, 219, 287
Chucks, Power, 261, 292, 355
Chucks, Rotary, 64, 65, 287
Chucks, Scroll, 351, 355
Chucks, Sine, 36
Chucks, Universal, 250, 331
Circuits, 221
Clamp Components, 82, 289
Clamping Systems, 348
Clamps, 22, 52, 98, 99, 116b, 116c, 250, 254, 279, 289, 291, 298, 310, 328, 331, 333
Clinching Machines, 237
Clinometers, 310
Coil Handling Equipment, 285
Coiling Machines, 111
Collectors, Diamond, 320
Collet Attachments, 235
Collets, 235, 241

"You make money every time
you chuck with *Buck*"



**The original 6-jaw
chuck...**

Buck originated the 6-jaw Ajust-Tru® chuck and, though others have tried, none can equal the Buck in precision with speed.

Makers of Scroll, Power,
Dust Proof, Independent
Chucks.

Tool Show—Booth 821

Here's why...

You save labor time. Any experienced chuck operator can adjust the Buck to dead true precision *within one minute!*

You save re-chucking time. The exclusive Buck Ajust-Tru® principle guarantees .0005" precision chucking duplicate parts.

You save replacement costs. The Buck automatically compensates for wear to give you far longer precision work-holding than obsolete design chucks—*yet cost no more!*

Send for catalog. See why, in *every* way —"It pays to chuck with Buck."

BUCK TOOL COMPANY

414 SCHIPPERS LANE • KALAMAZOO, MICHIGAN

For more data circle 644 on Postpaid Card

April, 1960

MODERN MACHINE SHOP 355

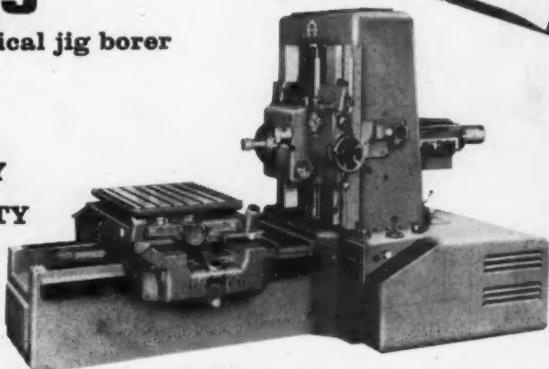
Comparators, 12, 27, 30, 116, 197, 256, 283, 300, 304, 307, 309, 324, 330, 337
Compasses, 234
Control Systems, 267, 283, 322
Controlling Devices, 102, 300
Coolant Units and Systems, 234, 241, 315, 323
Counterbores, 18, 47, 55, 84, 221, 224
Countersinks, 55, 84, 165, 214, 224, 257, 277, 280
Couplings, 113, 256
Cranes, 90
Cut Off Machines, 86, 109, 291, 303, 334, 372
Cut Off Wheels, 109, 334
Cutters, Deburring, 214
Cutters, Form, 50, 51
Cutters, Gear, 147
Cutters, Inserted Blade and Tooth, 147, 238
Cutters, Keyway, 260
Cutters, Milling, Front Cover, 33, 47, 50, 51, 147, 190, 237, 238, 303, 337, 345, 346
Cutters, Special, 214, 303
Cylinders, Hydraulic and Pneumatic, 57, 237, 271
Deburring Machines, 103
Demagnetizers, 64, 65
Diamond Compounds, 310
Diamond Wheels, 58, 59
Diamonds and Diamond Tools, 83, 256, 307
Die Casting Machines, 5
Die Filers, 277, 345
Die Heads, 41, 208
Die Lifting and Handling Machines, 247, 258
Die Sinking Machines, 10, 11, 25, 226
Dies, Punching or Forming, 33, 37, 47, 84a, 84b, 84c, 84d, 173, 206, 251, 263, 278, 302, 335, 347
Discs, 280
Dividing Heads, 164, 219, 226, 282, 331
Dogs, Lathe, Grinder and Miller, 239
Dressers, Grinding Wheel, 307
Dressing Fixtures, Grinding Wheel, 31, 98, 99, 174, 252, 256, 279, 280, 304
Drill Heads, 117, 153, 169, 179, 239, 243, 281, 341
Drill Jigs, 195, 261, 277
Drilling Attachments, 239
Drilling and Tapping Machines, Combination, 8
Drilling Machines, Automatic, 94, 95
Drilling Machines, Bench, 48, 301
Drilling Machines, Multiple Spindle, 48, 301

Drilling Machines, Radial, 48, 94, 95, 207, 271, 332
Drilling Machines, Sensitive, 48
Drilling Machines, Turret, 94, 95, 312
Drilling Machines, Vertical, 48, 64, 65, 92, 227, 240, 249, 258, 301
Drilling Units, 154, 169, 179, 243, 281, 296, 349
Drills, Center, Core, Twist, etc., Front Cover, 33, 37, 47, 55, 84, 147, 214, 246, 253, 259, 277, 280, 287, 294, 304, 311, 317, 344
Drills, Portable Pneumatic, 262
Drills, Step, 317
Drivers, Work, 239
Duplicators, 69
Dust Control Equipment, 203, 236, 320, 372
Edge Finders, 280
Electrical Discharge Machining Equipment, 10, 11
End Mills, Front Cover, 33, 47, 55, 147, 212, 213, 214, 259, 275, 304, 314, 329, 337
Engraving Machines, 25, 316, 371
Fabricators, 69, 298
Facing Heads, 242
Feed Fingers, 297
Feed Units, 273, 285, 298
Feeler Gage Stock, 332
Felt Parts, 244
Files, 28, 159, 214, 365
Files, Rotary, 23
Finishing Machines, 247, 248, 254, 310
Fittings, Pipe-Thread, 271
Flats, Glass Optical, 30
Flexible Shaft Equipment, 169, 179, 313, 335
Forging Machines, 90
Forming Machines, 40, 206
Furnaces, Heat Treating, 211, 231, 257, 321, 328
Gage Accessories, 223, 229, 253, 309, 310
Gage Blanks, 256
Gage Blocks, 30, 189
Gage Handles, 256
Gages, 30, 37, 46, 47, 78, 102, 197, 223, 229, 240, 241, 245, 274, 283, 290, 300, 304, 309, 310, 324, 335, 337
Gear Burring Machines, 350
Gear Chamfering Machines, 350
Gear Checking Equipment, 311
Gear Cutting Equipment, 311
Gears and Gear Units, 113, 256
Generators, 234, 315, 323

CUT ACCUMULATED ERRORS to a minimum with the **DIXI 75**

horizontal optical jig borer
increased
ACCURACY
VERSATILITY
PRODUCTIVITY

Made in Switzerland
Measurement in inches



- Automatic positioning can be changed instantly to manual operation
- Projected optical setting—direct reading to .00005" for linear motions and 1 sec. of arc for built-in rotary table. Linear optics provided with adjustable zero reference
- Simplified controls functionally arranged for greater operating speed and efficiency
- 3" diameter boring spindle
- Increased capacity: table size 39 $\frac{3}{8}$ " x 32"; 29 $\frac{5}{8}$ " cross travel; 23 $\frac{5}{8}$ " longitudinal travel; 25 $\frac{5}{8}$ " vertical travel
- Hydraulic feeds and infinitely variable spindle speeds
- Rear support optional

See the DIXI 75 in operation at the
ASTE SHOW, Booth 1505, April 21-28

M. B. I. EXPORT & IMPORT LTD.

A DIVISION OF MACHINERY BUILDERS, INC.



475 Grand Concourse, Bronx 51, N. Y.

Swiss Accuracy plus U. S. Know-how

For more data circle 645 on Postpaid Card

Grinders, Abrasive Band and Belt, 248, 258, 277
Grinders, Bench, 54, 372
Grinders, Chucking, 14
Grinders, Contour, 75
Grinders, Cutter and Tool, 10, 11, 80, 81, 106, 107, 305, 326
Grinders, Cylindrical, 326
Grinders, Die and Mold, 270, 310, 344
Grinders, Drill, 169, 179, 305
Grinders, Form, 326
Grinders, Gear, 350
Grinders, Hand, 169, 179
Grinders, Horizontal Spindle, 90
Grinders, Hydraulic, 90
Grinders, Jig, 29, 31, 225, 347, 349, 361
Grinders, Lathe, 54
Grinders, Pedestal, 54, 316, 372
Grinders, Portable Pneumatic, 9, 262
Grinders, Profile, 80, 81, 305
Grinders, Surface, 12, 90, 93, 199, 226, 326, 335
Grinders, Swing Frame, 298
Grinders, Tap, 227
Grinders, Tool Post, 54, 169
Grinders, Universal, 75, 106, 107, 267, 353
Grinders, Vertical Spindle, 54, 75, 90
Grinding and Buffing Machines, Combination, 54, 372
Grinding and Polishing Machines, Combination, 90
Grinding Fixtures and Attachments, 27, 29, 330, 335, 347
Grinding Wheels, 58, 59, 108, 199, 216, 334, 336
Guns, Spray, 155, 244
Hammer Molds, 287
Hammers, Hand, 159
Hand Tools, Power
 (Look for specific item)
Handles, Hammer, 287
Handles, Machine, 221, 277
Handwheels, 277
Hardening Compounds, 270
Hardness Testing Devices, 190, 209, 324, 346
Hinges, 250
Hobs, 47, 147
Holders, Boring Bar, 241
Holders, Die, 84a, 84b, 84c, 84d
Holders, Floating, 288
Holders, Punch, 84a, 84b, 84c, 84d, 273
Holders, Roll, 340
Holders, Scale, 188
Holders, Tool, Front Cover, 82, 114, 115, 157, 195, 215, 263, 280, 288, 312, 346

Holders, Work, 251
Hones, 104, 229
Honing Machines, 43, 104, 112, 229, 270
Hydraulic Equipment
 (Look for specific item)
Impregnators, Carbide, 238
Indexing Machines, 25
Indicators, 53, 197, 283, 300, 304, 307, 310, 342
Induction Heating Equipment, 296
Jacks, Leveling, 204
Jaws, Chuck, 253, 292
Jig and Fixture Components, 82, 289, 310
Jig Bore, 31, 225, 227, 234, 267, 357, 359, 361
Jigs and Fixtures, 92, 275, 300, 318, 331
Keys, Machine, 259
Keys, Socket Screw, 291
Keys, Woodruff, 259
Keyway Cutting Machines, 87, 298, 316
Knives, 90, 280
Knobs, Hand, 221, 277, 310
Knurlers, Hand, 266
Lapping Machines, 97, 110, 269
Lathes, Automatic, 15
Lathes, Bench, 227, 233, 319
Lathes, Buffing and Polishing, Combination, 372
Lathes, Engine and Toolroom, 34, 35, 63, 233, 249, 263
Lathes, Speed, 319, 343, 372
Lathes, Threading, 15
Lathes, Tracer, 38, 249
Lathes, Turret, 6, 7, 15
Lathes, Vertical Turret, 20
Layout Materials, 196
Levels, 310
Levelers, 283
Levers, 277
Light Wave Measuring Equipment, 30
Lighting Equipment, 205, 312, 341
Lubricants, 307
Machining Units, Portable, 169, 179
Magnets, Lifting, 64, 65
Magnifiers, 241, 341
Marking Devices, 85, 116a, 194, 198, 210, 224, 236, 245, 322, 326
Measuring Instruments, Surface Profile, 265
Measuring Machines, Optical, 256
Measuring Machines, Universal, 225
Metallizing Equipment, 155
Meters, Roughness, 197, 304



JIG BORING MACHINE

WITH LEITZ OPTICS



Table size —
33½" x 18½"
Spindle speeds —
63 — 2000 RPM
Boring depth — 12"
Net Weight — 7500 lbs.



The ULTIMATE in

precision

speed

ease

Setting accuracy .00002"
Positioning accuracy .00012"

Select any point as starting point. "Zero-in" scales by push button. Read scales to millionths without leaving operator's position.

Direct reading on magnified screens in any quadrant from zero point. Table moves on double roller guides.

When only the best will do — check MSO first.



austin industrial corporation

76-H Mamaroneck Avenue

White Plains, New York

For more data circle 646 on Postpaid Card

April, 1960

MODERN MACHINE SHOP

359

- Micrometer, Setting Devices, 345
- Microscopes, 265, 309, 310, 335
- Milling Attachments, 96, 255
- Milling Heads, 271, 332
- Milling Machines, Automatic, 267
- Milling Machines, Double Head, 4, 261
- Milling Machines, Hand, 4
- Milling Machines, Horizontal, 10, 11, 25, 171, 313
- Milling Machines, Profile, 371
- Milling Machines, Turret, 96
- Milling Machines, Universal, 10, 11, 13, 171, 226
- Milling Machines, Vertical, 10, 11, 21, 25, 227, 249, 267, 272, 313
- Mills, Hollow, 339
- Mills, Midget, 214
- Mills, Tube, 40
- Mounted Wheels and Points, 344, 370
- Mountings, Machine, 340
- Nibblers, 242
- Notching Machines, 251
- Notching Units, 186, 298, 337
- Nutsetters, Portable Pneumatic, 262
- Nuts, 235, 310
- Nuts, Tee, 265, 310
- Oil Groovers, 330
- Oilers, 273
- Oiling Machines, 330
- Parallels, 188, 242, 245, 281
- Parters, Rod, 251
- Parts, Machine Tool, Production, Aircraft, etc., 30, 175, 330
- Peening Tools, Bearing, 224
- Penetrators, Diamond Ball, etc., 209
- Pins, Dowel, Taper, etc., 163, 259, 291, 325
- Planer-Millers, 316
- Planers, 293
- Plate and Sheet Working Machines, 294
- Plates, Angle, 188, 281
- Plates, Floor, 188
- Plates, Layout, 188, 281
- Plates, Sine, 36, 116d
- Plates, Surface, 188, 242, 281
- Pliers, 52, 116b, 116c
- Plugs, 291
- Plungers, Spring, 289
- Polishing Machines, 54, 90
- Polygons, 290, 310
- Positioning Fixtures and Devices, 64, 65, 148, 149
- Powders, 263
- Presses, Arbor, 72, 269
- Presses, Automatic, 277, 320
- Presses, Forcing, 62
- Presses, Hydraulic, 72, 74, 77, 269
- Presses, Power, 67, 105, 206, 220, 249, 266, 320, 352
- Presses, Punch, 220, 251, 266, 275, 337
- Presses, Turret Punch, 71
- Profiling Machines, 25
- Projectors, Optical, 205
- Protractors, 245
- Pullers, 273
- Pulleys, 113, 256
- Pumps, Coolant and Lubricant, 278, 309
- Punches, 251, 254, 278, 302
- Punching Units, 298, 337
- Pushers, 235
- Pyrometers, 221
- Quills, 179, 232, 282, 349
- Racks, Gear, 113, 259
- Reamers, 33, 37, 47, 55, 147, 214, 217, 221, 259, 280, 303, 308, 325
- Reels, 273, 285
- Refractories, 58, 59, 108, 336
- Retainers, 250, 302
- Rings, Truing, 195
- Riveting Machines, 228, 234, 237, 278
- Rolling Machines, 251, 283
- Rolls, 270, 340
- Routers, 259, 345
- Rules, Slide, 338
- Rust Preventatives, 295
- Sanders, Portable Pneumatic, 262
- Sanding Machines, Belt and Disc, 284
- Saw Blades, Band, 28, 159, 193, 298, 365
- Saw Blades, Circular, Front Cover, 363
- Saw Blades, Hack, 28, 125, 159, 319, 365
- Saw Blades, Hole, 28, 365
- Saw Blades, Power, 28, 125, 319, 365
- Saw Blades, Slitting, 33, 280, 345
- Saw Frames, Hack, 28, 365
- Sawing and Filing Machines, Combination, 226
- Sawing Machines, Band, 88, 268, 293, 299
- Sawing Machines, Contour, 258
- Sawing Machines, Hack, 125, 277
- Sawing Machines, Radial, 293
- Scrapers, Power and Hand, 307
- Screwdrivers, Portable Pneumatic, 262
- Screw Machines, Automatic, 5
- Screws, Cap, Set, Socket and Machine, 291, 310, Back Cover

MANEX

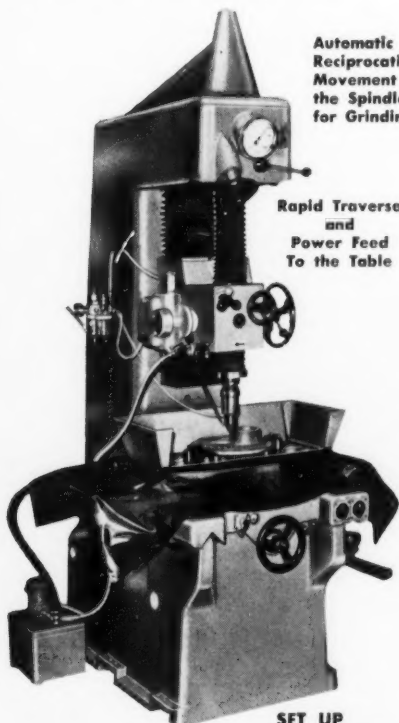
OPTICAL JIG BORER and JIG GRINDER

(OPTIONAL)
2 Machines-in-One \$7885.00

F.O.B. Docks, N. Y.

All Castings are made of Meehanite
 All Gears are Hardened and Ground

Magnetic Brake
 Variable Speed Drive
 56 to 2000 rpm



Automatic
 Reciprocating
 Movement of
 the Spindle
 for Grinding

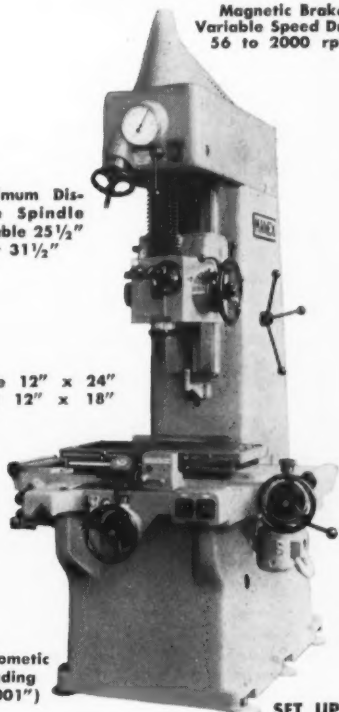
Rapid Traverse
 and
 Power Feed
 To the Table

SET UP
 AS A JIG GRINDER

Maximum Dis-
 tance Spindle
 to Table 25 1/2"
 or 31 1/2"

Table 12" x 24"
 Feed 12" x 18"

Micrometric
 reading
 (.0001")



SET UP
 AS A JIG BORER

A QUALITY PRODUCT
 BUILT FOR
**Sustained Accuracy and
 Lasting Performance**

DISTRIBUTORS: A Few Territories Open. Write

MANEX MACHINERY CORPORATION

204 Central Park South

New York 19, New York

For more data circle 647 on Postpaid Card

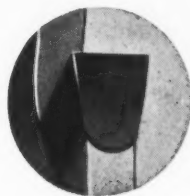
April, 1960

MODERN MACHINE SHOP 361

- Screws, Transfer, 276, 307
 Sealants, 352
 Segments, Grinding, 199
 Separators, Lubricant, 311
 Services: Milling, Grinding, Lapping, Rebuilding, Repairing, Business, etc., 15, 30, 46, 50, 51, 104, 214, 260, 278, 280, 281, 282, 284, 287, 289
 Shapers, 44, 45, 233, 267
 Sharpeners, Drill, 63
 Sharpening Fixtures, 227, 275
 Sharpening Machines, Saw, 318
 Sharpening Machines, Tool, Inside
 Front Cover
 Shearing Machines, 44, 45, 76, 90, 251
 Shears, Bench, 253
 Shears, Slitting, 253
 Shears, Squaring, 16, 17
 Shelving, 336
 Shim Stock, 332
 Shims, 73, 332
 Sleeves, 275
 Slicers, Crystal, 261
 Slitting Machines, 40
 Sockets, 89
 Solenoids, 268
 Spacers, 328, 332
 Special Machinery, 25, 74, 154, 209, 249, 287
 Speed Reducers, 113, 256
 Spindles: Grinding, Boring, Milling, etc., 14, 19, 169, 175, 281, 318, 330
 Spring Winders, 191, 251
 Springs, 221
 Sprockets, 113, 256
 Squares, 188
 Staking Machines, 60
 Stampings, 73, 328, 329
 Steel, Die, 336
 Steel, Special Purpose, 49, 339
 Steel, Stainless, 49
 Steel, Tool, 32, 49, 306, 336
 Steel Stock, Ground Flat, 159
 Stops, Collet, 260
 Straightedges, 188, 242, 281
 Straightening Machines, 273, 285
 Stud Sets, 265, 310
 Stud Setters, 322
 Studs, 310
 Superfinishing Machines, 15
 Switches, 268
 Tables, Drill, 342
 Tables, Elevating, 247
 Tables, Machine, 169
 Tables, Rotary and Index, 31, 66, 148, 149, 225, 226, 245, 255, 273, 280, 287, 331, 338
 Tables, Universal, 247
 Tables, Work, 332
 Tailstocks, 331
 Tapes, Pressure Sensitive, 58, 59, 108
 Tapping Attachments, 230, 231, 239, 302, 341
 Tapping Heads, 117, 239, 243, 281, 341
 Tapping Machines, 90, 92, 177
 Tapping Units, 169, 179, 181, 296
 Taps, 33, 37, 47, 70, 222, 308
 Threading Attachments, 230, 268
 Threading Machines, 90, 92, 228
 Tool Blanks, 289, 346
 Tool Posts, Turret, 245, 303
 Tools, Boring, 259, 330
 Tools, Broaching, 279
 Tools, Burnishing, 26, 253
 Tools, Carbide, 23, 47, 55, 147, 157, 173, 193, 214, 242, 246, 259, 263, 280, 314, 334, 335, 337, 345, 346, 363
 Tools, Chamfering, 257, 274
 Tools, Deburring, 165, 224, 257, 274
 Tools, Fastening, 89
 Tools, Grooving, 257
 Tools, Honing, 104, 229, 337
 Tools, Lapping, 284
 Tools, Measuring, 290
 Tools, Nutrunning, 89
 Tools, Recessing, 121, 253, 322
 Tools, Reciprocating, 285
 Tools, Relieving, 317
 Tools, Screwdriving, 89
 Tools, Special Cutting, 33, 55
 Tools, Spotfacing, 257, 311
 Tools, Threading, 248, 268, 340
 Tools, Trepanning, 253
 Tracers, Lathe, 347, 364
 Transfer Processing Machines, Automatic, 25
 Transfer Units, Press, 300
 Trimming Machines, 294
 Tubes, Collet and Pusher, 235
 Tubing, Carbon, Alloy and Stainless Steel, 24
 Turning Attachments, 226
 Turning Attachments, Radius, 252
 Turning Fixtures, 261
 Turning Machines, 226
 Valves, 68, 264, 292
 Vises, Bench and Machine, 82, 164, 195, 202, 219, 238, 241, 255, 261, 279, 292, 305, 310, 331
 Washers, 310
 Wear Parts, 263
 Wires, Measuring, 30
 Wrenches, Torque, 338

GAY-LEE

CARBIDE TIPPED * THINSAW



* Carbide tip has circular seat that provides more brazing surface, positive seating and greatest holding strength. Patented, Manufactured under license.

Engineered to Precision Limits . . .

Production slow? Here's a saw that's ideal for fast precision slitting, slotting, or sawing. The Gay-Lee Carbide "Thinsaw" features patented long-wearing Carbide tips. These tips are securely set into a specially designed seat providing extra brazing area and maximum tip security and cutting strength.

The Carbide "Thinsaw" is made wafer thin for delicate work yet maintains positive alignment for full depth cutting without runout.

They are available in any grade Carbide with thicknesses as low as .030". They are ideal for cutting all non-ferrous metals and plastics. A Gay-Lee Carbide "Thinsaw" lasts longer than ordinary saws and saves costly production time by reducing the need for frequent re-sharpening.

The next time you need a particular saw for a precision job, try a Gay-Lee Carbide "Thinsaw", they're engineered for production work to extreme precision limits.

Standard the world over . . .

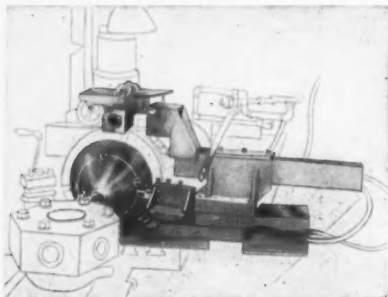




"a velvet touch and a tiger's response"

All MIMIK® Tracers—

- Have universal positioning.
- Can fit any machine.
- Require only minutes to install.
- Involve no machine tool conversion.
- Are easy to set up.
- Can use templates or round masters.
- Fully guaranteed.
- Have unequalled accuracy.
- Have micrometer settings on X & Y.
- Interchangeable between machines.

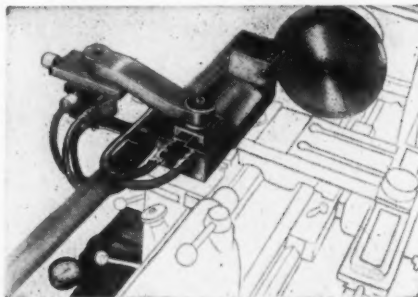


MIMIK® can do all these things because its unique valve is so incredibly versatile there is practically no limit to the way it can be applied in a Tracing System.

Your MIMIK® Tracer will pay for itself in months, not years, and not only will slash costs, but will enable your existing machine tools to do work far beyond their present capacity.

**THE RETOR®
MIMIK
HYDRAULIC
TRACER**

For more data circle 648 on Postpaid Card



▲ **"9000" Series for Engine Lathes:**

- Six standard models to fit any lathe.
- Replaces existing compound.

◀ **"5000" Series for Turret Lathes:**

- Rear mounted on ram type.
- Replaces 4-way tool post on saddle type.

▼ **"3000" Series for VTL's:**

- No machine tool conversion.
- Fits into ram or turret like conventional toolholder or replaces tool post on side head.



U.S. LICENSED MANUFACTURERS.

East Coast—Farmington Mfg. Co., Farmington, Conn.
Central—Bartsch Tool Corp., 6570 N. Harlem, Chicago.
West Coast—Allied Pacific Mfg. Co., 17825 S. Santa Fe Ave., Los Angeles.

Sales Representatives in all major U.S. and Canadian cities.

CANADA • RETOR DEVELOPMENTS • GALT, ONTARIO



now available!

NEW CLEMSON STAR High Speed and Duraband Saw Blades

—Specify the one best
suited to your equipment

For high speed equipment, specify new Clemson Star *High Speed Band Saw Blades*. They withstand temperatures generated by heavy duty sawing ... up to 1100° F... and will cut quickly and easily through tough, steels and rugged alloys. And they're built to last.

For standard equipment, specify new Clemson Star *Duraband Heavy Duty Blades*. Made of a new type, long-life,

alloy steel, they feature excellent heat and abrasion resistance... make possible increased feed and speed rates of *standard equipment*... extend the range and types of materials that this equipment can be used to cut. Their increased life-span significantly lowers your production costs, too.

Both these new Clemson Star Bands are cut and welded to your exact spe-

cifications... and shipped in clearly marked containers that tell you their contents at a glance.

Where do you get them? At your Clemson Star authorized distributor ... the same place you get standard Clemson Star Band Saw Blades in the revolutionary Reel-Pac dispenser. Call him today. He's your best source for all your metal cutting tool needs.



CLEMSON STAR

CLEMSON BROS., INC. • Middletown, N. Y.
METAL CUTTING PRODUCTS

POWER HACK SAW BLADES • HAND HACK SAW BLADES • HACK SAW FRAMES
BAND SAW BLADES • HOLE SAWS • FILES • CLEMSON HAND MOWERS

For more data circle 649 on Postpaid Card



©1946

April, 1960

MODERN MACHINE SHOP

365

INDEX to advertisements

-A-

A. K. Tool Co., Inc.	280
AMF Tool Div., American Machine & Foundry Co.	305
Aber Engr. Wks., Inc.	190
Abrasive Products, Inc.	348, 349
Acme Institute of Technology, Inc.	282
Acme Tool Corp.	285
Acromark Co.	326
Advance Products Corp.	338
Agel Mfg. Co.	203
Airborne Instruments Laboratory	102
Allegheny Ludlum Steel Corp.	32
Allen Mfg. Co.	163
Allenaire Corp.	264
Allison-Campbell Div., American Chain & Cable Co., Inc.	109
American Chain & Cable Co., Inc., Allison-Campbell Div.	109
Wilson Mechanical Instrument Div.	209
American Drill Bushing Co., Inc.	Third Cover
American Edelstaal, Inc.	263
American Machine & Foundry Co., AMF Tool Div.	305
American Saw & Mfg. Co.	193
American Steel Foundries, Elmes-King Div.	77
Anton Machine Wks.	251
Apex Machine & Tool Co.	89
Armstrong-Blum Mfg. Co.	125
Armstrong Bros. Tool Co.	22
Associated Technical Sales Co.	315
Atlas Press Co., Clausung Div.	21, 351
Austin Industrial Corp.	359
Auto Moulding & Mfg. Co.	250
Avey Div., Match & Merryweather Mchry. Co.	66

-B-

Babcock & Wilcox Co.	24
Bacon Felt Co.	244
Baj Tool Co.	279
Bar Products Co.	234
Barber-Colman Co.	50, 51
Barnes Drill Co.	43
Bay State Tap & Die Co.	70
Bearings, Inc.	100, 101
Beaver Pipe Tools, Inc.	86

Berkroy Products Co.	270
Beverly Shear Mfg. Co.	253
Black Drill Co.	294
Blanchard Machine Co.	199
Boice-Crane, Inc.	298
Bokum Tool Co.	114, 115
Borel & Dunner, Inc.	342
Boston Gear Wks.	113
Bridgeport Machines, Inc.	96
Brightboy Industrial Div., Weldon Roberts Rubber Co.	91
Briney Mfg. Co.	232
Brookfield, Inc.	215
Brown & Sharpe Mfg. Co.	13, 212, 213
Brush Instruments, Div. Clevite Corp.	53
Bryant Chucking Grinder Co.	14
Buck Mfg. Co.	64
Buck Tool Co.	355
Bullard Co.	20
Burg Tool Mfg. Co.	94, 95
Burr & Son, John T.	316
Busch Co., J. C.	242
Bystrom Co.	260

-C-

Cadillac Stamp Co.	116a
Cardinal Machine Co.	238
Carroll Dividing Head Co.	282
Cerro de Pasco Sales Corp.	276, 285
Chicago Gear Wks.	256
Chicago-Latrobe	55
Chicago Mfg. & Dist. Co.	311
Chicago Quadrill Co.	153
Chicago Tool & Engr. Co.	255
Cincinnati Electrical Tool Co.	372
Cincinnati Gilbert Machine Tool Co.	247
Cincinnati Lathe & Tool Co.	63
Cincinnati Milling Machine Co.	10, 11
Cincinnati Shaper Co.	44, 45
Cincinnati Sub-Zero Products Co.	61
Clausing Div., Atlas Press Co.	21, 351
Cleereman Machine Tool Corp.	8
Clemson Bros., Inc.	365
Cleveland Automatic Machine Co.	5
Cleveland Crane & Engr. Co.	76
Cleveland Instrument Co.	197
Commander Mfg. Co.	341
Comtor Co.	290

Cook Lead Hammer Service	287
Corrosion Reaction Consultants	295
Cosa Corp.	371
Covel Mfg. Co.	12, 93
Cramer Controls Corp.	60
Crane Packing Co.	97
Cratex Mfg. Co., Inc.	216
Cunningham Co., M. E.	322
Curvit Div., Macclodyne Corp.	111
Cushman Chuck Co.	57

-D-

Dake Corp.	72
Deakin, J. Arthur	316
Dearborn Gage Co.	189
Delta Power Tool Div., Rockwell Mfg. Co.	48
Detroit Stamping Co.	332, 333
DeVlieg Microbore, Div. of DeVlieg Machine Co.	157
Diamond Supply Co. of America	256
Dixie Bearings, Inc.	100, 101
Dixie Tool Industries, Inc.	345
Dreis & Krump Mfg. Co.	206
duMont Corp.	56
Dumore Co.	169, 179
Dundick Tool Wks., Inc.	240
Durant Tool Co.	273
Duro Metal Products Co.	301
Dykem Co.	196

-E-

Eastern Machine Screw Corp.	208
Eclipse Counterbore Co.	18
Edroy Products Co.	241
Eisler Engr. Co., Inc.	281
Electra Products Co.	321
Elmes-King Div., American Steel Foundries ..	77
Enterprise Machine Parts Corp.	204
Ettco Tool & Machine Co., Inc.	243
Ex-Cell-O Corp.	175

-F-

Field Tool Supply Co.	37
Fosdick Machine Tool Co.	39
Foster Supplies Co.	223

-G-

Gammons-Hoaglund Co.	325
Gatco Rotary Bushing Co.	246
Gay-Lee Co.	363
Gisholt Machine Co.	15
Glover Mfg. Co.	280
Gorton Machine Co., Geo.	25
Grant Mfg. & Machine Co.	278
Graphic Systems	267

Graymills Corp.	309
Greaves Machine Tool Co.	171
Green Mfg. Co.	297
Greenard Arbor Press Co.	269
Greenlee Bros. & Co.	230
Grobet File Co. of America, Inc.	23
Gwilliam Co.	281

-H-

Hamilton Tool Co.	177
Hammond Mchry. Builders, Inc.	259
Hannifin Co., Div. of Parker-Hannifin Corp. ..	62
Harig Mfg. Co.	173
Hartford Special Mchry. Co.	154
Haskins Co., R. G.	313
Hauser Mfg. Co.	258
Heald Machine Co.	Second Cover
Heimann Mfg. Co.	276
Heinrich Tools, Inc.	261
Hi-Duty Industries, Inc.	317
Hill Acme Co.	90
Himoff Machine Co., Inc.	282
Hoggson & Pettis Mfg. Co.	198
Holo-Krome Screw Corp.	Fourth Cover
Homestrand Machine Tool Corp.	207
Hones, Inc., Chas. A.	257
Huron Machine Products, Inc.	256
Hydraulic Press Mfg. Co.	74

-I-

Ideal Industries, Inc.	218
Insta-Clamp Co.	254

-J-

J & S Tool Co., Inc.	98, 99
Jacobs Mfg. Co.	187
Jean Mfg. Co.	252
Johnson Machine & Press Corp.	249
Johnson Mfg. Corp.	268
Jones & Lamson Machine Co.	116

-K-

Kalamazoo Tank & Silo Co.	88
Kapp Engineers, H.	277
Kasenit Co.	270
Kennametal, Inc.	314
Keo Cutters, Inc.	260
Kett Tool Co.	323
Kidde Precision Tool Corp.	260
Klaas Machine & Mfg. Co.	266
Kryz, Joseph	284

-L-

L & J Press Corp.	105
L-W Chuck Co.	219

Laminated Shim Co., Inc.	73
Lapeer Mfg. Co.	116b, c
Lawley Granite Surface Plate Co.	281
LeBlond Machine Tool Co., R. K.	34, 35
Leland-Gifford Co.	369
Lewthwaite Machine Co., T. H.	258
Lexco Engr. & Mfg. Corp.	247
Linley Bros. Co.	234
Lodge & Shipley Co.	38

-M-

M.B.I. Export & Import, Ltd.	357
Machine Products Corp.	188, 277
Machine Tool Exposition	79
Madison-Faessler Tool Co.	26
Madison Industries, Inc.	121
Magna-Lock, Inc.	36
Mahr Gage Co., Inc.	324
Manex Mchry. Corp.	361
Mathewson Machine Wks., Inc.	277
Matthews & Co., Jas. H.	194
McCrosky Tool Corp.	217
Metal Cutting Tools, Inc.	246
Metallizing Engr. Co., Inc.	155
Metallurgical Products Dept. of General Electric Co.	83
Micromatic Hone Corp.	106, 107
Minster Machine Co.	67
Mitts Merrill, Inc.	87
Modern Mfg. Co.	293
Mahr Tool & Mfg. Co.	248
Monarch Mold & Engr. Corp.	318
Moore Special Tool Co., Inc.	31
Morris Co., Robt. E.	4
Morrison Co., D. C.	298
Morse Twist Drill & Machine Co.	33
Mummert-Dixon Co.	298

-N-

National Acme Co.	41
National Machine Tool Builders Association. 79	
Needham, Earl H.	119
Neise, Karl A.	327, 329, 331
New Method Steel Stamps, Inc.	245
Newage Industries, Inc.	270
Newtools, Inc.	287
Niagara Machine & Tool Wks.	16, 17
Nichols-Morris Corp.	164
Nicholson File Co.	159
Nielsen, Inc.	248
Nielsen Tool & Die Co.	307
Nirol Mfg. Co.	255
Nobur Mfg. Co.	274
Northwestern Tools, Inc.	310
Norton Co.	58, 99, 108
Nu-Tangs, Inc.	289

-O-

O.K. Tool Co., Inc.	First Cover
Olivetti Corp.	353
O'Neil-Irwin Mfg. Co.	84a, b, c, d
Onsrud Machine Wks., Inc.	29

-P-

Parker-Hannifin Corp.	62
Parks Woodworking Machine Co.	293
Peerless Machine Co.	299
Pemco Perforators Co.	278
Perkins Machine & Gear Co.	191
Pines Engr. Co., Inc.	103
Pioneer Broach Co.	345
Pipe Mchry. Co.	78
Pope Mchry. Corp.	19
Porter Machine Co.	278
Pratt & Whitney Co., Inc.	334, 335, 336, 337
Precision Tool & Mfg. Co. of Ill.	251
Procurier Safety Chuck Co.	181
Pyrometer Instrument Co.	221

-R-

Ready Tool Co.	239
Reed Rolled Thread Die Co.	340
Reich Mfg. Co., J. R.	284
Reid Tool Supply Co.	221
REM Sales, Inc., Subsidiary of Robt. E. Morris Co.	4
Retco Mfg. & Sales	252
Retor Developments, Ltd.	364
Richards Co., J. A.	170
Robbins Co., Omer E.	116d
Rockford Engineered Products Co.	195
Rockwin Mfg. Co.	266
Rotor Tool Co.	210
Royal Oak Tool & Machine Co.	27
Ruthman Mchry. Co.	278

-S-

Safety Socket Screw Co.	291
Sales Service Mfg. Co.	320
Savage Co., W. J.	242
Schauer Mfg. Corp.	343
Scherr-Tumico Co.	265
Schmidt, Inc., Geo. T.	85
Schupack Supply Co.	370
Scully-Jones & Co.	84
Sentry Co.	211
Service Machine Co.	220
Severance Tool Industries, Inc.	214
Sheffer Collet Co.	235
Sheffield Corp.	46
Sheldon Machine Co., Inc.	233
Silber Products, Inc.	317



**YOUR BEST SOURCE FOR HARDENED
AND GROUND PARTS
as well as for drill jig bushings**



In addition to making the most comprehensive range of standard and special drill jig bushings, BRINEY is always prepared to supply hardened and ground parts promptly and economically. Send your prints and specifications to the nearest Leland-Gifford office for fast service.

**Sold and Distributed by
LELAND-GIFFORD**

WORCESTER 1, MASSACHUSETTS, U. S. A.

DISTRICT OFFICES

CHICAGO 8
2315 W. Peterson Ave.
CLEVELAND 32
P. O. Box 853
DETROIT 21
10429 W. McNichols Rd.
INDIANAPOLIS 6
P. O. Box 1051

LOS ANGELES
3829 Leona Blvd.,
Van Nuys, Cal.
NEW YORK
73 S. Orange Ave.,
South Orange, N. J.
ROCHESTER 12
P. O. Box 24,
Charlotte Station

For more data circle 650 on Postpaid Card

Smith Co., Leonard	307
Snow Mfg. Co.	92
Somerset Tool Co.	304
Sossner Tap & Tool Corp.	222
Spartan Saw Wks., Inc.	319
Speedlap Corp.	110
Spellman Co., R. L.	254
Sperman Metal Specialties	174
Springfield Machine Tool Co.	75
Standard Electrical Tool Co.	148, 149
Standard Steel Specialty Co.	259
Standard Tool Co.	47
Stanley Tools	202
Stevens Co., John B.	287
Stocker & Yale, Inc.	205
Sturdy Broaching Service, Inc.	275
Sturtevant Co., P. A.	338
Sunnen Products Co.	104
Superior Hone Corp.	112
Supreme Products Corp.	42

-T-

Tapmatic Corp.	302
Thermo Electric Mfg. Co.	328

144 ABRASIVE WHEELS & POINTS

Brand New
Perfect First
Quality
Mounted on 1/4"
Steel Mandrels

ONLY
\$28.50

Postpaid
in U.S.A.
Imported



List value
\$93.60
Save
up to
\$65.10

72 Abrasive Wheels & Points on 1/4 inch steel mandrels \$26.50

Complete in Handy, Sturdy Container At No Extra Cost

If after 10 days you are not fully convinced that this is the greatest wheel and point value in the industry, return the set at no cost or obligation on our part. Illustrated Free Catalog on Request

SCHUPACK SUPPLY CO. DEPT. MS-23
7331 Cottage Grove Ave. Chicago 19, Illinois
For more data circle 651 on Postpaid Card

Thomas Hoist Co.	250
Thor Power Tool Co.	9
Thriftmaster Products Corp.	117
Titan Tool Supply Co., Inc.	234
Tomkins-Johnson Co.	237
Torit Mfg. Co.	236
Torsion Balance Co.	192
Troyke Mfg. Co.	280
Twentieth Century Mfg. Co.	221

-U-

Union Twist Drill Co.	147
Union Twist Drill Co., Hartex Div.	80, 81
U. S. Burke Machine Tool Div.	272
U. S. Electrical Tool Co.	54
Universal-Cyclops Steel Corp.	49
Universal Engr. Co.	82

-V-

Valvair Div. of IBEC	68
Van Keuren Co.	30
Veet Industries	271
Victor Mchry. Exchange, Inc.	307
Victor Saw Wks., Inc.	28
Vimco Mfg. Co.	312
Vlier Engr. Corp.	52
Vogel Tool & Die Corp.	186
Vulcan Tool Co.	347

-W-

W & F Machine Wks.	316
Wales-Strippit Co.	69
Walker Co., Inc., O. S.	64, 65
Wallace Supplies Mfg. Co.	303
Walls Sales Corp.	284
Wardwell Mfg. Co.	318
Warner & Swasey Co.	6, 7
Watts Bros. Tool Wks.	304
Weldon Tool Co.	165
Wicaco Machine Corp.	330
Wiedemann Machine Co.	71
Wilson Mechanical Instrument Div., American Chain & Cable Co., Inc.	209
Wirth & Son, Inc., Carl	339
Woehr Machine Co., F. A.	283
Wolverine Cutter Co.	304

-Y-

Yoder Co.	40
-----------	----

-Z-

Ziegler Tool Co., W. M.	288
-------------------------	-----

DECKEL

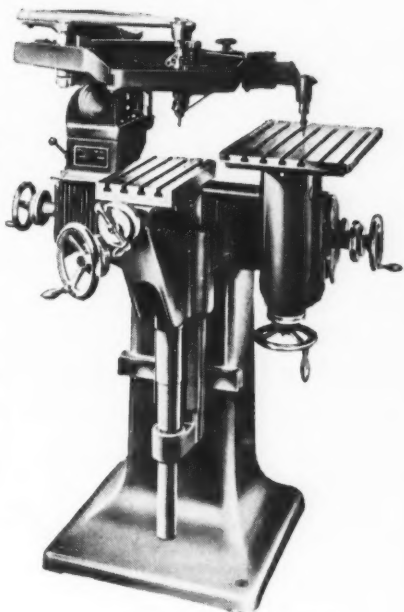
Engravers And Copy Millers Cut Costs, Increase Accuracy

Designed for fingertip control, the 3-dimensional pantograph of Deckel Engraving and Profiling Millers assures absolute accuracy of reproduction. Ease of operation cuts down needed production time. High surface finish requires little or no hand finishing—reducing costs even further.

Pre-loaded bearings in the pantograph provide easy guidance, playless motion, minimized vibration. Pantograph weight is delicately balanced during lowering and lifting by a spring within the column. Control and view of the entire operation is simplified by support of the master and workpiece at nearly the same level. Unlike other makes, cutter and tracer move in the same direction for all three dimensions. Reducing or enlarging ratios run from 1:1.5 to 1:10.

The Deckel GK-12 is designed to produce delicate engraving, light milling, dies for plastic molding or die casting.

The Deckel GK-21 provides increased metal cutting capacity for rough and copy milling of dies and molds up to 550 lbs.



The Deckel GK-12 Pantograph
Engraving & Profiling Miller

Write For Additional Information

COSA

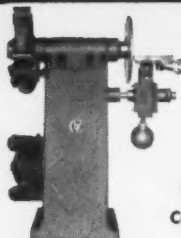
**Importers of Leading Precision Machine Tools
Nationwide Sales and Service**

COSA CORPORATION, 405 LEXINGTON AVENUE, NEW YORK 17, N.Y.

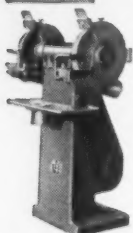
In CANADA contact COSA CORPORATION OF CANADA, LTD., 1160 Lakeshore Road, Long Branch, Toronto 14, Ontario
For more data circle 652 on Postpaid Card

Everybody **KNOWS** the line that **KNOWS** its

P's and Q's

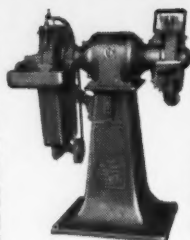
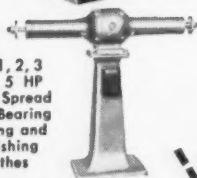


Belt-Drive
Disc and
Combination
Grinders



2, 3 & 5 HP
Pedestal
Grinders

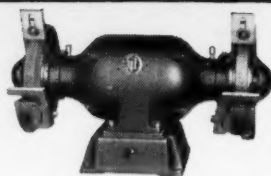
3/4, 1, 2, 3
and 5 HP
Wide Spread
Four-Bearing
Buffing and
Polishing
Lathes



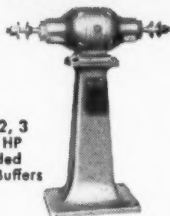
Combination Wet-
and-Dry Grinders



Ball
Bearing
Speed
Lathes
chuck
and
Collet
Types



Heavy Duty
Bench Grinders



3/4, 1, 2, 3
and 5 HP
Extended
Spindle Buffers



3/4, 1, 2, 3
and 5 Com-
bination
Grinders
and Buffers

PRICE is an attractive feature in the famous CINCINNATI general purpose buffers and grinders, supplied in a variety of capacities and designs since 1902.

QUALITY, however, has never been sacrificed in the production of these buffers and grinders. We sincerely believe the Cincinnati line is America's top dollar value!

Featured Nation-wide by Leading Distributors. Write For Catalogue TODAY!
Makers of a complete line of pedestal and bench grinders and buffers, speed lathes, dust collectors and cut-off machines.



THE **CINCINNATI** ELECTRICAL TOOL CO.

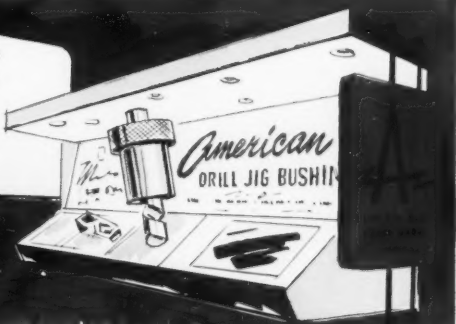
330 MT. HOPE AVE.

CINCINNATI 4, OHIO

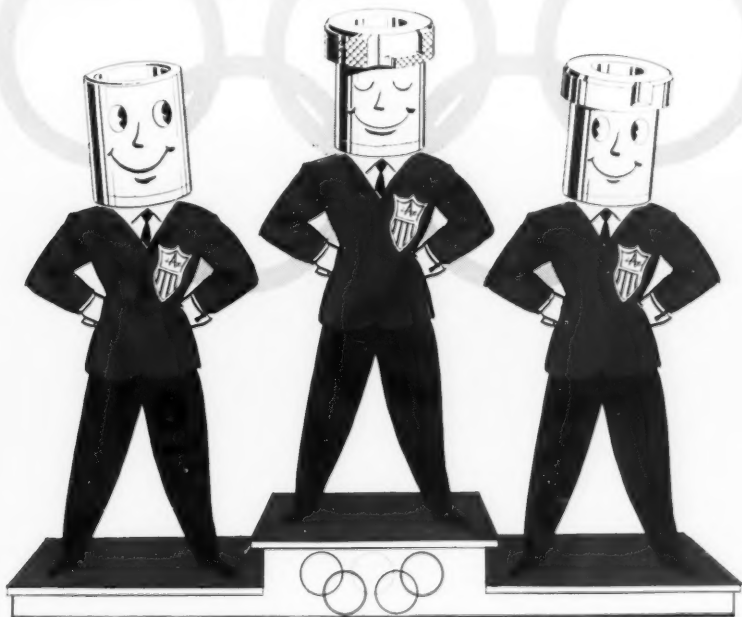
For more data circle 653 on Postpaid Card

VISIT BOOTH No. 1309
A. S. T. E. TOOL SHOW

FOR ANOTHER
American
"LIFE SAVER"



CHAMPIONS!

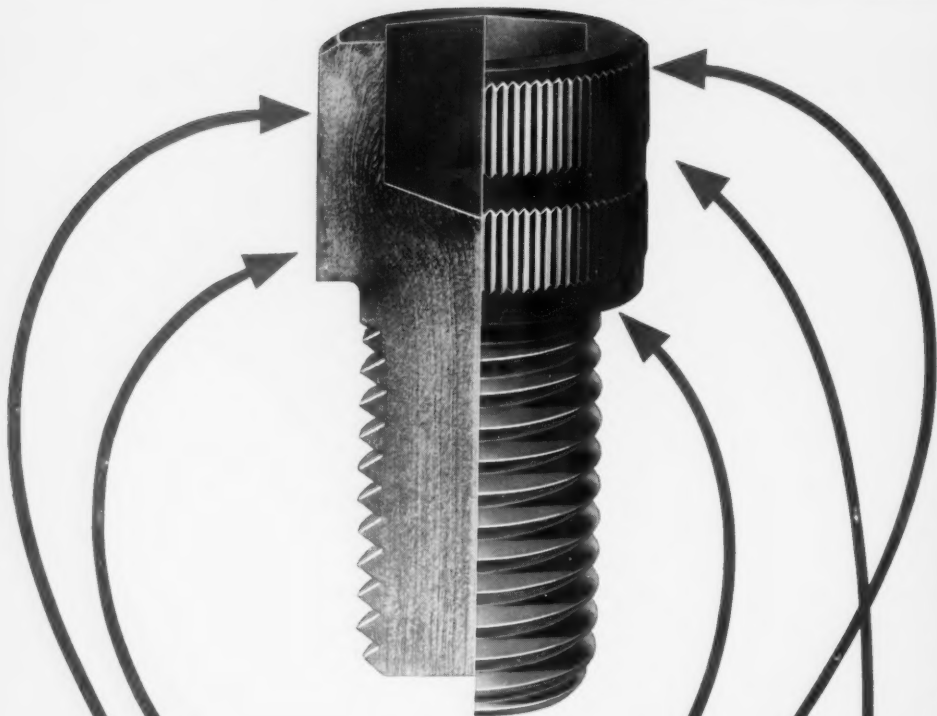


When the stakes are high, it's the finish that counts! American drill jig bushings keep on giving the same accurate hole placement and alignment, time after time after time.

Write for your American catalog today and pick your own winner — every one a champion! Another Champion is your American distributor, who can make prompt delivery from his complete stock.

American DRILL BUSHING COMPANY

5107 Pacific Blvd. • Los Angeles 58, Calif. • LUdlow 3-6551 TEL. LA 1315
For more data circle 303 on Postpaid Card



THERE IS A DIFFERENCE IN SOCKET SCREWS

Look at this cutaway of a forged socket cap screw from H-K. Notice the smooth, flowing lines of the metal fibers that give greater strength to the screw . . . look at the clean sockets scientifically proportioned for maximum strength . . . observe the controlled forged fillet under the screw head. These are features no other socket cap screw can match.

You won't see other features just as important to your production line: special analysis alloy steel heat-treated to 39-42 Rockwell "C" hardness . . . threads formed to Unified Class 3A fit . . . a new and different forging method that produces the toughest socket screws made . . . an atmospherically controlled hardening process. And behind all these features, the now famous SAME-DAY SERVICE on all standard catalog items!

Look for the difference in H-K socket screws . . . see the difference at your production line!



HOLO-KROME SOCKET SCREWS

SOLD ONLY THROUGH AUTHORIZED HOLO-KROME DISTRIBUTORS
THE HOLO-KROME SCREW CORPORATION • HARTFORD 10, CONN.

For more data circle 304 on Postpaid Card



